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Improved Tobacco Press.

Our engraving illustrates a new and improved tobacco press for packing tobacco in casks, which is extremely simple and powerful, and has in it, we believe, all the elements of a successful invention.

It is easily taken to pieces and can be packed in a very small space. It has nothing complicated about it, and requires no mechanical skill to work it and keep it in order.

The simplicity of the invention and the skill of our artist leave little for us to do in the way of description, and the device can hardly fail to be comprehended at once by the most unmechanical reader.

A triangular frame, shown in Fig. 2, is placed under the bottom of the cask as indicated. The inventor does not, however, limit himself to this form of frame, any other suitable form being covered by his patent. From the angles of this arise links, A, which connect the bottom frame with a spider, B, at the top, the links being held in place when in use by screws, as shown.

The large screw works in a nut held in its place by a set screw, C, so that it will not drop when the screw is run up. The nut abuts against an internal shoulder formed in the hub of the spider, so no strain is exerted upon the set screw.

The operation of pressing tobacco in hogsheads is delineated in Fig. 1, which explains itself. When it is desired to transport the press from place to place, or to apply it to another cask, it may be taken down in a very short time, and put up again when wanted, without any trouble.

It is certainly the most simple and the cheapest form of press for this purpose we have met with, and we think it will become a popular implement on tobacco estates.

For further information address W. S. Ford, Evansville, Ind. Patent pending through the office of the Scientific American Patent Agency.

Fig. 1

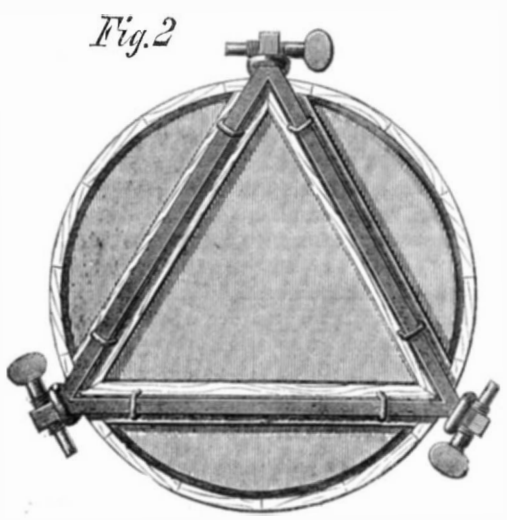
FORD'S IMPROVED PLANTATION TOBACCO PRESS.

White Brass.

According to *Engineering* this metal is the invention of Mr. P. M. Parsons, and is manufactured by him at the Thames Foundery, East Greenwich. Although somewhat similar in appearance to some of the alloys known as white metal, it nevertheless differs from them most materially in other respects, inasmuch as it is harder, stronger, and sonorous. It is in fact, as its name indicates, a species of brass, and behaves in a similar manner to that metal under the tool when bored or turned. It does not clog the file and is susceptible of a very high polish, at the same time its fusing point is lower than that of ordinary brass, and it can be melted in an iron ladle over an ordinary fire. These special features render the metal valuable for fitting up machinery where first cost has to be kept down, as it can be run in place for bearings, or bushes, thus avoiding the expense of fitting or boring. It can also be cast in metal molds, or even in sand and loam like ordinary gun-metal. Although this new metal is not very generally known, we find it to have been in use for some years past in various engine works and on several of our leading railways, where it has proved itself particularly suitable for the bearings of engines and carriages and the wearing parts of machinery generally. Having indicated some points of resemblance existing between white brass and ordinary brass, let us now turn to the points of difference which are very marked. Compared with gun-metal or ordinary brass, white brass is the cheapest, whilst at the same time its durability is greatly in excess of either of those metals This latter point has been established by a series of carefully conducted experiments on the Great Northern Railway made with carriages running in the express train between London and Edinburgh, the axles being fitted with ordinary brass bearings at one end, and white brass bearings at the other. These experiments were instituted by Mr. Sturrock, and they form the subject of a report from that gentleman, and which is now before us.

According to this report, which is dated the 20th May, 1862, it appears that two white brass bearings, fitted under a brake van, lost only two ounces in weight in running 19,400 miles. Two ordinary brass bearings fitted under the other end of the same van, and which traveled the same distance, lost 2 lb. 4 oz. In another case a third-class carriage was fitted up in a similar manner, and ran 20,000 miles. Here the white metal bearings lost only 2½ oz., whilst the ordinary brass bearings lost 1 lb. 6 oz. In another third-class carriage similarly fitted, the diminution in the white metal bearings was 2½ oz., whilst in the ordinary brass bearings it was 1 lb. 12 oz. in running 20,000 miles. The bearings ran perfectly cool, and were lubricated with oil. In July, 1864, four white brass bearings were taken from a brake van which had run 64,712 miles. Mr. Sturrock reports that the bearings were still in very good order, and but little worn. After this important testimony to the value of this metal, little more, we think, can be added than that it has proved itself equally successful in bearings for general purposes. We cannot find that such a thing as a hot axle has ever been heard of where it has been used as a bearing; in fact, it seems to possess the peculiar property of lubricating itself to a certain extent when the oil or grease fails. This much is certain, that when it was adopted on the Great Northern Railway, the stoppage of the long express train from London to Edinburgh from hot axles entirely ceased, although stoppages from this cause had previously been of constant occurrence. It would seem to us that the knowledge of such facts as we have here before us, is all that is required to render the use of white brass general.

Fig. 2



The "Fluidity" of Solids.

In an editorial upon this subject *Engineering* says:

"There have been probably no investigations carried out during the past few years which possess a higher scientific interest than the admirable series of experiments which have been conducted by M. Tresca, on what he has aptly termed the 'flow of solids.' The subject is one which has been frequently noticed in our pages, and in our number for June 7, 1867, we published the valuable paper by M. Tresca, read before the Institution of Mechanical Engineers, during their meeting at Paris that year. This paper, with which many of our readers are no doubt familiar, contained a full account of the results which M. Tresca had obtained up to that date, and of the deductions which were to be drawn from them; but since then M. Tresca has devoted further attention to the subject, and it is of the results of his more recent investigations that we now desire to speak.

"M. Tresca's earlier experiments had shown that when a solid body, such as a metal, was subjected to the action of a compressing force more than sufficient to overcome its elasticity it behaved more or less like a fluid, an actual 'flow' of the particles taking place. The pressure necessary to produce this flow has been named by M. Tresca the 'pressure of fluidity,' and one of the objects of his later researches has been to determine this pressure in certain cases. Moreover, it is clear that when a solid is subjected to pressure, the action of that pressure is most intense at the point where it is directly applied, and becomes less and less intense as that point is receded from; and hence it may be assumed that there is, in fact, a limit beyond which, practically, no action whatever takes place. The area comprised within the limit just mentioned has been named by M. Tresca the 'zone of activity,' and another object of his more recent investigations has been to ascertain the limit of this zone in certain instances.

"It necessarily follows from the assumption that the 'zone of activity' has, practically, definite limits, that the resistance which any given punch will experience in being forced through a given metal is also limited, and that there is, in fact, a certain maximum beyond which the resistance cannot rise, however great the thickness of the metal to be traversed may be. Let us suppose, for instance, a punch to rest upon a plate having a thickness which is very considerable in proportion to the area of the punch, and let us suppose the pressure on the latter to be gradually and steadily increased.

Under these circumstances a 'zone of activity' of gradually increasing size will be formed beneath the punch, this increase going on until the intensity of pressure on the latter is equal to the 'pressure of fluidity' of the particular solid which is being experimented upon. As soon as this point is reached the resistance to the motion of the punch will, according to the theory we are now enunciating, cease to increase, and the latter will descend steadily, the metal flowing laterally from beneath it. This, of course, will only continue to be the case so long as the 'zone of activity' is contained wholly within the thickness of the plate. As soon as the punch has descended so far that the 'zone of activity' touches the under surface of the plate, the latter commences to bulge, and, there being a free outlet below, the lateral flow of the metal ceases, and the shearing action commences.

"That the action above described does really take place under the circumstances we have supposed, has been proved by M. Tresca's later experiments, and we cannot but regard the fact as one of very high scientific interest. We hope in a future number to give a detailed account of M. Tresca's more recent researches, and of the deductions he has drawn from them; for the present, however, we must merely remark that the values of the 'pressure of fluidity' of any material furnished by various experiments, have been found to remain sensibly constant, and that they approximate closely to the number representing the resistance to shearing."

CLEANING MARBLE.—It is said that marble may be cleaned by mixing up a quantity of the strongest soap lye with quicklime, to the consistence of milk, and laying it on the marble for twenty-four hours. Clean it afterwards with soap and water. Or else use the following: Take two parts of common soda, one part of pumice-stone, and one part of powdered chalk; sift through a very fine sieve, and mix with water. Then rub it well all over the marble, and the stains will be removed. Then wash with soap and water as before, and it will be as clean as it was at first.

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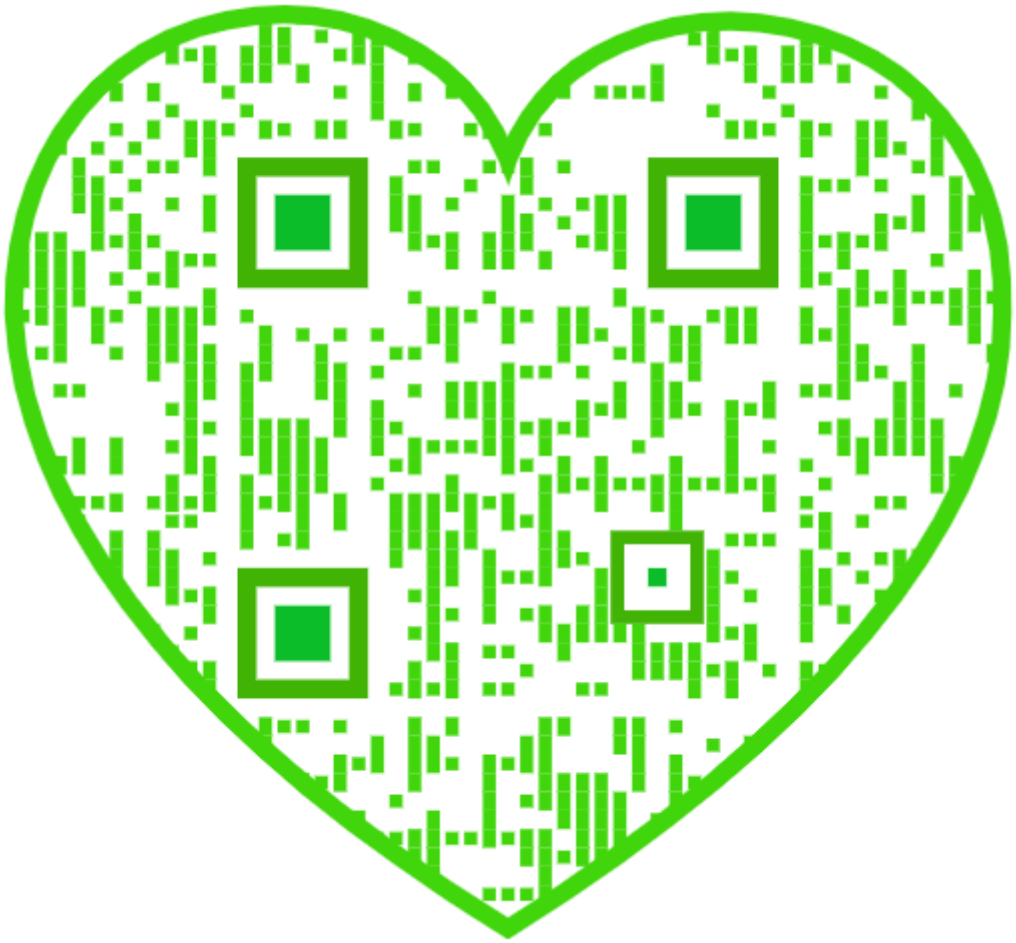

THE NATURE AND FOOD OF MAN.

BY W. BRIDGES ADAMS.

All the objects, animate or inanimate, in this world of ours, whatever the processes they have gone through, or may go through, would seem to culminate in their utility to man for his various purposes, physical and mental. We are accustomed to call these processes art, as distinguished from nature; but, in truth, the work in the alembic of man's brain, whereby the forms of matter are changed and altered, is as much a process of nature as a volcano or an earthquake, a boiling spring, or a rock, or metal deposit, or the growth of a tree. Man can originate nothing; he can only exercise volition over existing processes coeval with creation. He may choose one or more seeds out of a heap, and plant or destroy one or all of them, but he cannot create a single seed. Modify them he may, by various processes, but they must all be processes of nature, whether coming through his brain or not. He is not even an imitator; he is simply the user, as he may be the abuser. He is one of the agents employed by nature, with freedom of choice to select his own work, but, nevertheless, working according to fixed laws only, yet with so enormous a space and variety that his brain, unable to take in the whole scope of the objects he works on, frequently becomes confused, and he imagines that he has created when he has only uncovered something. We do not know the laws whereby minerals are compelled to aggregate, or crystals to form. We can hardly imagine volition or a sense of enjoyment in the process; and as little do we know of the principle of life in plants or animals. All we know is, that they aggregate and gather matter together in various modes, and that with decay the matter disperses again to assume new forms, productive, and destructive, and re-productive following each other in a constant, if not unvarying round. To man only is it given to control and vary these processes according to the perceptions of his brain, the promptings of the nature within. The wants of a man in a savage state, the one necessity of his existence in a warm climate, is simply food, and this nature provided for him in the spontaneous growth of vegetables and fruits of many kinds. The next want as he traveled northward or southward from the equator was warmth, and this had to be provided for by fire first, next by clothing, and next by shelter. Nature gave him trees for his firing, so soon as he discovered how to obtain fire wherewith to burn them. The skins of beasts formed "robes of durance," and rock caverns gave roofs for shelter, needing little repair. Oil and sugar-bearing plants and fruits were not native to the cold regions, but nature provided animals, fish, flesh, and fowl, and man grew to be a hunter, and a neat herd, and a shepherd, and built dwellings of timber and of stone, and took the wool of the sheep, instead of the skin of the wild beast, wherewith to spin and weave his garments.

And thus food, fuel, clothing, and shelter, marked the dawn of his growing civilization, appropriating nature's gifts to his especial uses, as a property securing him against want. And then he grew to be luxurious, saving his own physical labor in locomotion by appropriating the labor of the lower animals, bringing the higher nature of his brain to dominate their lower natures, taming the ass and the horse, and subjugating the bull and the elephant; the strongest brains also subjugating their fellow-men—fellows, but not equals, creatures of gradation. And out of his brain sprang the wheel and axle—a germ of planetary movement—and he came to ride in carriages drawn by many kinds of beasts, and clothed in purple and fine linen, and faring sumptuously every day. And he made boats and ships, and went down to the sea and over the sea, and all out of the timber which nature had prepared for him before his birth. And he imagined in that seething natural brain of his how to use the running streams and moving winds of nature, to harness them to his water and wind mills, and grind his corn, and do his other drudgery for him. And he grew ambitious, and tyrannous, like lions, and tigers, and bulls, and stags; and he made his fellow-men into fighters like wolves in a pack, and planned new varieties of weapons very different from that wherewith Cain slew Abel, to slay other men, by wholesale and more rapid processes. But other men profited by and imitated his doings, and learned to resist tyranny, and at length it was discovered that wealth, the object of all men, as insuring abundance and safety against want could be better, and more easily, and more abundantly procured by the processes of commerce than of war. Direct slavery was abandoned as fast as it was found to be unprofitable, but indirect slavery—the pressure of poverty forcing men into repugnant drudgery—continued, and still exists in many places.

Civilization cannot exist in its highest condition without a population thick upon the ground, with its stimulus of competition and rivalry, and many wants; but if this population be merely used to supply physical power, it will be no better than the slaves of old. Nature is the great power-source in the supply of heat, and whether the heat be elicited by the consumption of food in the human body, or by the sun producing wind or evaporating water, or by the burning of fuel, it is the same power. But using the human body as a mere drudge degrades man to a condition analogous to that of the lower animals, and it is impossible in such a condition to attain the highest degree of general civilization. Man must, therefore, resort to fuel, but if that fuel were to be the same as it was in the beginning—timber—it would all rapidly disappear, and the earth be denuded and deteriorated. For this, too, nature has provided. In her coal cellars underground, stocked before man's birth, physical power is provided in enormous masses, and the *manu*factory disappears in the machine processes worked by coal power. Man may fill the earth with useful things without drudgery or degradation, and the fruits remain as things of use and of beauty, gratifying his higher and constantly awakening tastes. Through all the centuries of growth man has been constantly seeking to assimilate more and more the productions of nature to his special uses. He made the crab into an apple, the sloe into a plum, and almost every variety of vegetable is changed in its form, sometimes till it becomes diseased and all but disappears, and the wild stock is resorted to, to restore the race. The grape, and the potato, and the hop alike suffer, as well as the apple orchard. All this is simply disease engendered by empiricism analogous to the diseases that attack man himself. Time was that a Smithfield Cattle Club gave prizes for and bred up food animals to an unhealthy degree of inedible fat till they were past walking or healthy exercise, and it is only of late years that the object sought has been the best quality of food. Turnips get over-guanoed in the desire for rapidity of production, and get a flavor of their origin, as do dunghill fowls and pigs that feed upon carrion, as in the pampas of Buenos Ayres, where they taste as of train oil, and the fowls fed on beef have the flavor of beef, and not of fowls.

In thickly peopled communities, food, especially the choice kinds of food, are constantly increasing in price, the reason being that there is a constantly increasing demand, and it is sought to supplement the supply by imitations, and thus there is a general outcry against adulterations. The adulteration is, of course, by a cheaper commodity, and if it is a very good imitation it affords a larger profit. People generally have a superstitious idea as regards food produced, as they term it, naturally, in opposition to what they term artificially, and will pay a large price for a natural production, in preference to a small price for an artificial one, even though the artificial one be the best. What is food? Any substance capable of being chemically assimilated by the body, without anything in it detrimental to health, is perfect food, whether we get it directly from nature or through the secondary nature of man's brain. It is possible that original nature may be the best chemist, but it is also certain that occasionally her chemistry is very erratic. Take for example the article of fresh butter, which has grown to be almost a myth. Nothing can be more delicate than its flavor in the best condition, but it may happen to be made from a cow out of health, and it is not good. Butter is fat, and with what is called a butyric acid flavor, coming through the udder. But if a chemist take the fat of a cow, or any similar fat from other sources, and flavor it with artificial butyric acid, identical with the natural, the fat being so chemically treated as to free it from all extraneous matters, it is possible that better butter might be produced than that coming from the cow direct, and quite as natural. All that we have to complain of is, when an artificial article is produced of worse quality than the original. And if whale or porpoise oil, or herring oil, or palm oil, could be chemically converted to the analogue of the cow's fat, called butter, there is no reason why they should not become human food; nor is it yet quite certain that coal may not ultimately become a source of food. If alcohol can be produced from it, why not many other analogous substances, as sugar and starch.

There is a prevalent idea that life can only be sustained by organic matter that has once been living, but if we trace the fact downwards from man to the lower organizations we shall find that though man feeds on mutton which is made from sheep, and the sheep from turnips, and the turnips from guano, all organic, there are many plants that assimilate gases and inorganic minerals directly, and even man himself, when he takes minerals in the form of medicine, or in salt as a condiment, assimilates inorganic matter. Animals killed for food in a condition of physical weariness have no flavor and do not satisfy hunger, and "animal spirits" may be taken as a synonym for flavor. But if after eating this flavorless food subacid sweetmeats be taken, a chemical action is set up, and assimilation begins. The flavor of wild animals and game, that yield such relishing food, is, probably, due to the fact that they live in pure air, and are killed in a state of physical vigor, in addition to the healthy chemical vegetation on which they are fed—wild thyme and other herbs.

The food of man consists of milk, butter, cheese, eggs, poultry, flesh, game, fish, grain of many kinds, sugar, oil, fruit, both sugary and oily, and vegetables, some in the condition originally provided by simple nature, and others improved and otherwise varied by the complex nature of man. Examining these by chemical analyses, resolving them into their alternate constituents, what do we find? The gases, carbon, oxygen, hydrogen, nitrogen, and a modicum of minerals, the same that are found in coal. In the far west of America men occasionally use the grain of maize as fuel in the absence of anything cheaper.

Abstractedly considered, it is not a pleasant thought to bury dead animals within our own bodies, albeit they are gases at second hand. Generally, nature provides for us the materials of food cheaper than we can make them by our modifications, but they are not always specially available without our modifications. Forest trees furnish an abundant supply of the gases constituting animal bodies, and so do various kinds of fungi; but timber is not food, though a mushroom is, and very good food too, and the timber is, no doubt, convertible into mushrooms by chemical cultivation.

Wine, which "gladdens the heart of man," was originally the juice of the grape, but it grew to be the juice of many other fruits, and grains. The "low wines" of the distiller come from every vegetable substance convertible into sugar, and the Tartars contrive to obtain alcohol from animal juices, the milk of mares. Champagne wine is a manufacture occasionally from the juice of the grape, but very largely from many other juices. Chemists have proved that flavors and perfumes are convertible conditions of the same substances, and there seems no reason why the exhilarating and stimulating drinks consumed by man may not be wholly the production of man's secondary nature which we call art. There is no apparent reason why as perfect wine, as to flavor, and body, and healthy stimulus, should not be made by the chemist as by the grape grown in the vineyard.

The supply of fish as food seems to be abundant, if we only take pains to catch them, and possibly the time may come when we shall have fish farms, as we have cattle farms, tame fish instead of wild ones, but the supply of flesh in thickly peopled countries is far from abundant. Even grain and leguminous seeds are deficient till brought from countries where men are sparse. How to increase the quantity of food on a given area of land is a very important problem in human progress to a condition of higher civilization. Vegetable food we can preserve and accumulate, as Joseph did in Egypt. Animal food is more difficult to deal with.

There is much yet to do with the improvement of our vegetables to make them equally stimulating and nourishing with flesh. If carrots, turnips, and potatoes could be grown with the nitrogenous property and flavor of the mushroom, it would be an enormous advance in aliment. And if human art could convert the organic matter of coal, containing the elements of albumen, fibrin, and casein, into food, it would be a still greater advance. There seems to be no reason why cheese should not be made from peas, and beans, and lentils, flavored by the chemist, who gives us perfumes, and dyes, and oil from coal. There is no apparent reason why the coal should not yield us a food analogous to fresh butter, and we need not despair of obtaining milk quite as good as that of the cow in the best condition and pasture, direct from oily and albuminous vegetation, with a butyric flavor given by the chemist.

Nor have we yet done all that is possible in the growth of plants. We dig coals, and distil them into gas to light us, and with the refuse alone we make manure. We have not yet essayed the process of burning the coal in close chambers and passing the whole products of combustion underground, at a safe distance below the roots of the plants, giving them heat to stimulate their power of absorbing the gaseous nutriment. Our analysis has been extensive, but we are lamentably behind in our synthesis. We decompose, but with the knowledge thus gained we do not set inventors to work to compose with a will for useful purposes. Our gardeners try experiments here to produce curious varieties of flowers, to convert roses to all sorts of colors, not always of the most pleasing kind, and set up as a chief object of ambition the still unattainable black rose. And they make hideous dahlias, which can be excelled to outward appearance in wax-work. We can imagine that the time will come when "the sweat of the brain" within men's brows will be the true reading of the "sweat of the brow," and the production of all things useful to man will cease to be a painful drudgery, becoming only a healthy excitement, like the sports of hunting, rowing, or sailing, and athletic games. With all useful things in abundance, that poverty which consists in the privations of the sources of physical health will cease, and the great source of crime will disappear. If the supply of wants were merely from spontaneous production, men might be only a sort of wild savages, like those of the Pacific Islands—some of them, at their discovery—or like the inhabitants of the Landes, who were said to live on milk and chestnuts, without exertion of the body or brain labor. What is desirable is, that men should be enforced to labor, but not to excessive labor, only the labor essential to health, and to their several capacities, and that the means of healthy maintenance should exist for all. From the beginning men have been born with varying faculties, some quoted and signed by nature as rulers, not necessarily despots making slaves of their fellows, but with the capacities for devising law and order beneficial to general humanity. Such men are few in number, and probably we should find that in all ages of the world the percentage has been in about the same proportion, governed by some general laws that determine growth of all kinds under simple natural conditions.

Covetousness, avarice, greediness, and similar passions, are on the large scale the growth of habitual poverty, involving the possibility of starvation, and man, in proportion to the exercise of the reasoning faculties with which he has been endowed by nature, can prevent this poverty. He can, as his perception grows, store up the food of several years in one, and bid gnawing care avaunt! He can apply himself more and more to works of construction, and less and less to those of destruction, induced by the competition of two men having to divide at each meal the rations of one between them. They cannot form a "happy family" under such conditions. With these conditions removed, and replaced by better conditions, we may not attain the millennium, but we may, at least, obtain a distant view of it.

Universal Standard of Measurement.

According to the *Memorial Diplomatique*, the Austrian Government has just signified its assent to a proposal of the French Government for an International Commission to assemble in Paris in order to agree upon a common standard of measurement for all civilized nations. Already fifteen European powers have announced their willingness to take part in the Commission. Even England, which hitherto has been disinclined to depart from old customs, will be represented by the Directors of the Observatories of Greenwich and Oxford. The French Government now only awaits replies from the United States, Brazil, and the South American Republics previously to calling together the Commission. The Minister of Foreign Affairs would, of right, be the honorary president, but the proceedings will really be directed by the vice-president, General Morin, Director of the Conservatoire des Arts et Métiers, in whose archives is deposited the official standard of the meter recognized in France.

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Survey of Routes for the Darien Canal.

A correspondent of the New York *Times* writes to that paper the following particulars of the progress made by the exploring expedition sent to examine routes for the proposed Darien Canal. He says:

"At about 10 A.M., April 17, a telegram was received at the camp on the Morti river from headquarters, announcing that Commander Selfridge had concluded to abandon the Morti river route, which was a great surprise to all. The party who went on a reconnoissance to the Chaquanaqua had returned, and all were in good spirits, although somewhat fatigued and shoeless, having worn out all their shoes on the tramp. They had fully accomplished the object of the expedition, having determined the exact position of the mouths of the Navigandi, Asuati, and Sucubti rivers, and learned one important fact from the Indians that no other explorers have touched on, and that is that the River Chuquanaqua does not extend beyond the mouth of the Sucubti; the river running north-east from the mouth of the Sucubti is called the Ana, and uniting with the Sucubti forms the Chuquanaqua. They found a great number of Indians and Indian villages on their route, the Indians all extremely friendly.

"The party followed Strain's old trail for a considerable distance down the Sucubti. After the announcement that Commander Selfridge had concluded to abandon the Morti route, he ordered both vessels to get ready for sea. This announcement took every one by surprise. Still, it was welcomed, as all were getting tired of Caledonia Bay, and desired a change. Monday and Tuesday (18th and 19th) were spent in getting everything ready for sea. The telegraph was taken down (a distance of nine miles) and carried to the beach, together with the insulators, and by 6 P.M., Tuesday evening, everything belonging to the telegraph and surveying parties were snugly stored on board the *Guard*, and the evening spent in discussing this sudden change in the base of operations. Wednesday morning the steam launch was hoisted on board, and at 1 P.M. the *Nipsic* steamed out of Caledonia Bay with the *Guard* in tow, bound for San Blas. The Indians lined the banks and waved us a friendly adieu. Thus the 'Grand Expedition' passed away from the Isthmus of Darien.

"The *Nipsic*, after towing the *Guard* about two miles outside of Caledonia, dropped her and put off for San Blas, where she arrived Thursday evening before dark. The *Guard* arrived early Friday morning. Great numbers of Indians were found, who are extremely friendly. The donkeys and machette-men were then landed near the mouth of the Mandingo river, at the point where the survey will start from. The machette-men at once commenced building houses for themselves and one for the telegraph office. Early Saturday morning the survey commenced, Mr. H. G. Ogden, Assistant United States Coast Survey, in charge; the entire party, however, being in command of Lieut. Hubbard, of the *Nipsic*, with Ensign Jasper as sketcher. This party only made a half mile, but they did not press very hard, as the object was only to break ground and make a show. Monday morning, April 25, the work commenced in earnest. The surveying party, still under command of Lieut. Hubbard, who now has charge of the compass, Mr. Ogden being too unwell to go out. Ensign Jasper, sketcher. Working party (except the machette-men), all from the *Nipsic*. Mr. Merinden, in charge of the level, follows close on the heels of the surveyors. Then come the telegraphers. Up to to-night the survey has reached two miles and a half in the interior. The country here is much lower than about Caledonia Bay, and very swampy, having a feverish look and smell. The men are all disgusted with it, in fact they are afraid of it. There are some ten on the sick-list on board the *Guard* now, and nearly the same number on board the *Nipsic*, and it will surprise me very much if they are able to stay at San Blas two weeks. However, the officers and men are all good pluck, and if human endurance will count for anything against a manifestly unhealty climate, they will not leave there before the 1st of June. Still, the men all feel that they have been in the climate long enough, and would gladly get out of it at once. Commander Selfridge desires to reach the mountains on this line, or do something to prove the necessity of another survey at San Blas. The Bay of San Blas is very beautiful. It is about six miles wide by seven long, and magnificently land-locked by numerous beautiful islands. The Indians inhabit the islands; none of them live on the mainland, which is sufficient proof of the unhealthiness of the mainland. The work of surveying the bay is in the hands of Capt. Sull, of the *Guard*, who commenced operations early Monday morning. Capt. Sull is assisted by Mr. Sullivan, of the Coast Survey, and Ensign Hawly, of the *Guard*.

THE PROSPECTS.

"It rained steadily at San Blas for two days, and when the *Nipsic* left on the 29th ult. there was no prospects of clearing; heavy thunder, and sharp lightning accompanied the rain. It was expected that an entire new party would start from the *Guard* for the front, three miles inland, on the 30th, and it is feared the surveyors will not be able to go through the country, which is much overflowed. The Mandingo river had risen six feet up to 3 P. M. on the 29th, leaving a rise of five feet more before it would be possible to establish a camp on its banks. Should the rain continue twelve hours longer it would be impossible to proceed. Commander Selfridge is determined to cross to the Pacific, even if it occupies a month or two longer. The *Nipsic* will coal here to-morrow, and return immediately to San Blas. The United States steamer *Nyack* is at Darien Harbor, Gulf of San Miguel, and had proceeded up the Savanna river as far as possible. Reports say that the Indians on the Pacific slope are arming to resist Commander Selfridge's passage. The harbor of Darien, on the Pacific, is said to be magnificent and capable of accommodating any quantity of shipping. The country is perfectly healthy.

PERSONAL OBSERVATIONS.

"I traveled in company with several of the officers of the expedition across from Aspinwall to Panama on the 2d inst., and all united in saying that they had seen no finer river than the Chagres; and as regards the country through which it flows, they considered it far superior to any they had seen at Caledonia or San Blas for the construction of a canal. This corroborates the statements that I have made from the first, and I am satisfied that the great Interoceanic Canal must be constructed along the line of the Panama Railroad. Commander Selfridge has already established one fact, and that is, the impracticability of constructing a canal at Caledonia Bay."

Have Plants Intelligence?

If the oyster fastened on the rock can feel, why not the rose or the convolvulus, or the great oak tree that is fast rooted in the ground? Of the glow of the sunshine, or the freshness of the rain and the air, are they not pleased recipients? Who can tell? Or who shall deny, and give good reason for his incredulity? Who, however learned he may be, can decide where animal life ends, and where vegetable life begins? What, for instance, is a sponge? And if, as Linnæus says, plants have no feeling, what makes the mimosa, or sensitive plant shrink so timidly from the slightest touch, and apparently with such pain or terror from a ruder blow? Whether I am scientifically and philosophically right or wrong, I take pleasure in believing that the possession of life in however infinitesimal a degree, presupposes in its possessor, whether animal or vegetable, a faculty of sensation that administers to its happiness, and that may consequently administer to its suffering. For, pleasure and pain are twins, and the one is not attainable without liability to the other. The idea is not new to poetry, though not accepted by science. It blooms and sparkles in the graceful mythology of Rome; as all who remember the Dryads and Hamadryads; the loves of Apollo for Laura, Daphne and Acantha; or who at school or college have pored over the metaphors of Ovid, will readily admit. The Oriental poets of India and Persia delighted to animate the flowers and trees, and, according to Hafiz, the rose appreciates the tender melodies of her lover, the nightingale. Greek superstition endowed the Atropa Mandragora with all the sensations of an animal, and believed that it shrieked with pain when its roots were wrested from the ground.

Science may laugh at all such notions, but science, though a very great and learned lady, does not yet know everything. Her elder sister, poetry, often sees further and deeper into things than she does. Did not Shakespeare, in the "Tempest," foreshadow the possibility of the electric telegraph more than two hundred years before Wheatstone? Did not Dr. Erasmus Darwin, long in advance of James Watt and Robert Stephenson, predict the steamship and the locomotive? Did not Coleridge, in the "Ancient Mariner," explain the *modus operandi* of the then unsuspected atmospheric railway?

Don't Closely Cover your Water Cisterns.

Dr. Ballard, the Medical Officer of Health for Islington, England, says: "A severe outbreak of typhoid (enteric) fever occurred in the school belonging to the Holborn Union on the rise of Highgate Hill. As I receive no sickness returns from that establishment, I knew nothing of it until twenty-six cases had been received into the London Fever Hospital. The first death from typhoid fever was recorded in the mortuary schedule which reached me on 31st March, that is to say, five weeks after the first recognized case of typhoid had occurred in the house. I mention this because it is a striking illustration of the necessity of weekly returns of public sickness being forwarded to sanitary authorities, as well as returns of deaths. I am morally certain that the disease might have been prevented from spreading as it did in the school had I been in a position to interfere at its first onset. The first recognized case occurred in a boy who was sent to the Fever Hospital on February 24th; afterwards the fever attacked both boys and girls. On visiting the house on March 31st, I found that the children were in the habit of drinking from a closely covered cistern, the waste-pipe of which, untrapped, entered directly into the drain which conducted the overflow of a cesspool communicating with the boys' closet. Both the boys' and the girls' closets, in separate parts of the premises, are defective in construction. Up to the close of the month of March, 31 cases, including a nurse and a washerwoman, had been sent to the hospital. I directed the waste-pipes of the cisterns to be at once disconnected from the drains, and the cisterns themselves to be cleansed and disinfected, and that carbolic acid should be thrown daily into each drain inlet on the premises, and used for flushing the closets, and that the night-stools in the infirmary and dormitories should be charged with the same disinfectant. Up to the date of this report only three fresh cases have been sent to the hospital, and one of these patients was ailing at the time of my first visit. Five cases of typhoid fever with two deaths in a house in the Barnsbury-road have been traced to a similar cause. Householders are scarcely even now aware of the danger to which they are exposed from the stupid but common practice of covering the water cistern and then carrying a waste pipe from the vacant space directly into the house drain, by which this space becomes virtually a receptacle for the foul gases generated in the latter and for any poisonous matter which they convey. The inmates of houses where this arrangement exists are at the mercy of an accident which may happen any day."

Spring Dangers.

Thousands of familles are every year bereaved of the light and joy of the household, in the person of the little first-born especially, before the young mother has had experience to guide her in the preservation of the health and lives of children, but it is an easily avoided bereavement. Croup, diphtheria, and putrid sore throat have their fruitful cause in allowing little children to become chilled in the harsh, raw, penetrating damp atmosphere of sunset in spring-time. Outdoor air is certainly beneficial, but not always so. Children under twelve years of age ought to be studiously kept within doors after half an hour before sun-down until the first week in May at least. There is a chilliness in the air about sundown in spring which often makes even grown persons in good health uncomfortable in mind and body, penetrating and chilling the whole frame, and much more pernicious will it be to the tender constitutions of childhood.

In the afternoon of balmy spring days children engage in their plays and pastimes out of doors with great energy, the novelty of it inducing them to exercise beyond their strength, and as sun-down approaches, it finds them overheated, weary in body, and with a mind robbed of all its exhilaration; in this condition, the only safety is in bringing them into a warm room the very moment they cease their exercise, for if allowed to stand or sit, or loiter about in the cool of the evening, when more or less of a chill wind is always stirring, it requires but a very few minutes of such exposure to chill the whole body, which, falling on the throat or lungs, may prove fatal in any twenty-four hours.

Another fruitful source of these fatal diseases in children is in allowing them to get their feet wet in stormy, thawy, or muddy weather; hence, the moment a child comes in-doors from play in spring time, the feet should be examined by drawing off shoes and stockings, so as to be able to see and feel if attention is needed.

A third cause of death by the above-named diseases in spring time is over haste in removing winter clothing; the thickest flannel of mid-winter should be worn by all without any change to a thinner material, until the middle of May. This applies to old and young, and it is safest not to wear thinner outer clothing, because any given degree of temperature in spring is really colder by 15 or 20 degrees than in the fall, because the atmosphere is saturated with dampness which carries the heat from the body with great rapidity; besides this, the changes in spring are more sudden and violent than in autumn. There should be a bright, cheerful fire kept burning every day in the family room of every household until the middle of May north of thirty degrees north latitude. This one precaution alone would save multitudes of lives every year.—*Hall's Health Tracts.*

A Railroad in Greece.

The United States Consul at the Piræus, Greece, is writing to the *College Courant* a series of letters about Athens. Among the passages which sound oddly to the classical student, from the sharp contrast they present between the ancient and modern city, is the description of a trip by rail from Athens to the harbor. The road is only six miles long, and, though nowise extraordinary, it is a source of never-ceasing wonder to the natives. When it was first opened the Archbishop was present, and consecrated the locomotive and each car by sprinkling them with holy water. Still the average Greek cannot quite reconcile himself to it as anything in the ordinary course of nature, and when he takes passage he does not cease to cross himself until the motion has become familiar. Every day large crowds of countrymen flock to the depot, and gather on a bridge near by, to watch the train arrive and depart. Could some of their ancestors, who hewed the stone with which the track is laid, revisit their work, or look down upon it from the Acropolis, with what unutterable amazement would they contemplate the approach of a screaming locomotive, without even the poor protective of holy water! Accustomed as they were to the apparitions of gods, demigods, and monsters, this would be a spectacle for which even their mythology could furnish no parallel, and would dumbfound the wise as well as the ignorant. Think of Socrates soliloquizing over a steam engine, Diogenes with his tub dead-heading it to the Piræus, or haggling about a seven cent ticket, or Euripides working up a railroad catastrophe into one of his polished tragedies, or the courtly Xenophon taking topographical notes for his *Anabasis* from the window of a Pullman sleeping car! These unsophisticated old Greeks whom we imagine we understand fully, lived in an entirely different world, with which we can have but little sympathy. Shall some future generation say the same of us?

Oxygen Light.

M. Tessie du Motay has succeeded in obtaining a beautiful oxyhydric light by means of oxygen gas and supercarburreted hydrogen, doing entirely away with the lime, magnesia, or zircon pencils, which were the greatest objection to the universal application and public adoption of this new light. The great recommendation of this light is its brilliancy and cheapness. The cost, as we are told, is only two centimes per burner for five hours, or at the rate of three cents per week, for five hours each of the seven nights. In using this new method, M. Tessie du Motay has also avoided the high pressure formerly used, in order to obtain the brilliancy desired, and the two gases now arrive at the burner at a pressure of about one inch of water column.

The manufacture of oxygen by the manganate has also enabled M. Tessie du Motay to fulfill large contracts with alcohol bleachers and distillers in Paris and London, who are using the manganates to bleach and deodorize their spirits, to obtain the colorless and odorless Cologne spirits.

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Machine for Upsetting Tires, Shafts, etc.

Our readers are so familiar with the old method of upsetting tires, that we need not dwell upon the particulars of the operation.

We herewith present an ingenious and simple machine which so greatly facilitates the process of upsetting, not only tires, but straight, angular, or round bars, shafts, axletrees, etc., that it is claimed a boy of twelve years may operate it, so as to upset tires without assistance.

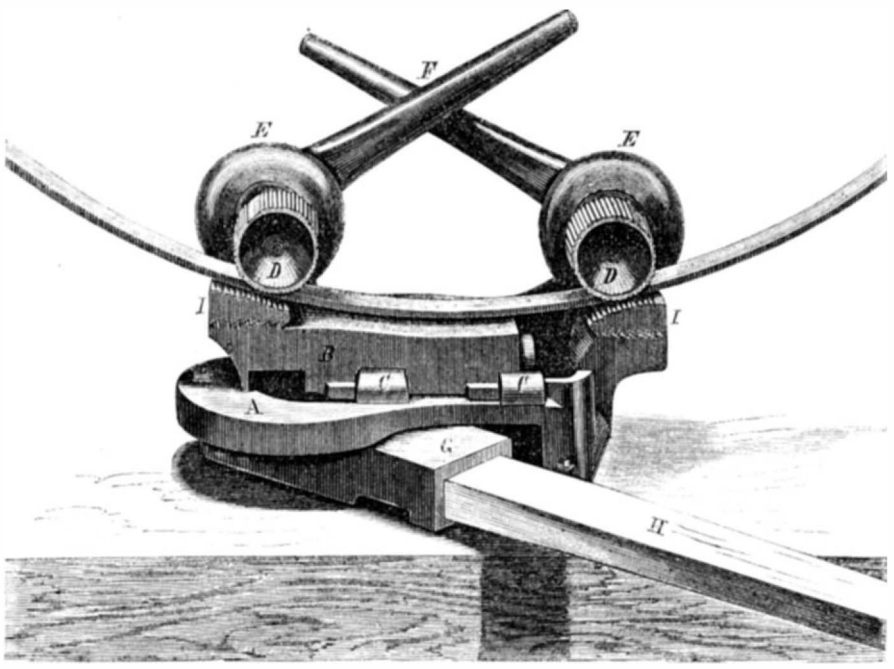
Referring to the engraving, A is a stationary frame, secured to a work bench. B is a sliding frame connected with the stationary frame by means of the slides, C. Serrated or eccentric cams, D, are caused to revolve on the uprights, E, by means of the handles, F, as shown. G is an eccentric, which revolving in the bed-plate of the sliding frame, B, when actuated by the lever, H, the sliding frame is moved backward and forward.

Serrated and notched blocks, I, are placed under the cams, D; said blocks being moved out or in to suit the different curves of the tire, or they can be taken off so as to form a straight line on the base, when the machine can be used for upsetting any kind of iron with equal facility.

The manner in which this machine is operated in upsetting tires is as follows: The sliding frame, B, is moved out from the stationary frame, A, by the movement of the lever, H. The handles, F, are then turned up so as to open the space under the cams, J, which are then ready to receive any sized tire.

The iron, when heated sufficiently, is placed under the cams, and the handles, K, are then turned down, which will securely hold the tire. The sliding frame, B, is then moved forward more or less by means of the lever, H, compressing the tire as may be desired.

These machines are manufactured and sold by E. Shopbell, to whom a patent was granted, Aug. 31, 1869. Address him for further information, at Ashland, Ohio.



SHOPBELL'S MACHINE FOR UPSETTING TIRES.

THE CLOTHES-MOTH AND ITS ALLIES.

[By Edward C. H. Day, of the School of Mines, Columbia College.]

The ladies of the household are now packing away the warm woolens and costly furs of winter, and every precaution is taken to secure them from the ravages of the insects that the heat of summer will bring forth; but in too many cases the care bestowed will be insufficient, and when the articles are called for again at the commencement of the cold season, we shall find, to our dismay, that our enemies have been ruinously at work. A ragged hole, a little cocoon tell the tale; or, if we are unpacking articles unused since last summer, a tiny winged creature fluttering away, as we unfold the injured fabric, bears living witness to another stage of the spoiler's existence. We crush the pest; and a little pile of fine dust is all that is left of a creature that, however mischievous in its habits, is still full of interest in its history and its associations. "Why, it is only a moth! a little plain-colored moth: the amount of whose destructiveness is indeed vast when compared with the sum total of its bodily insignificance" This is very true, but that little moth is the most familiar representation of a family of tiny beings, in many of which the most exquisite beauty is associated with habits none the less curious and even important to man, from being almost unnoticeable by the naked eye.

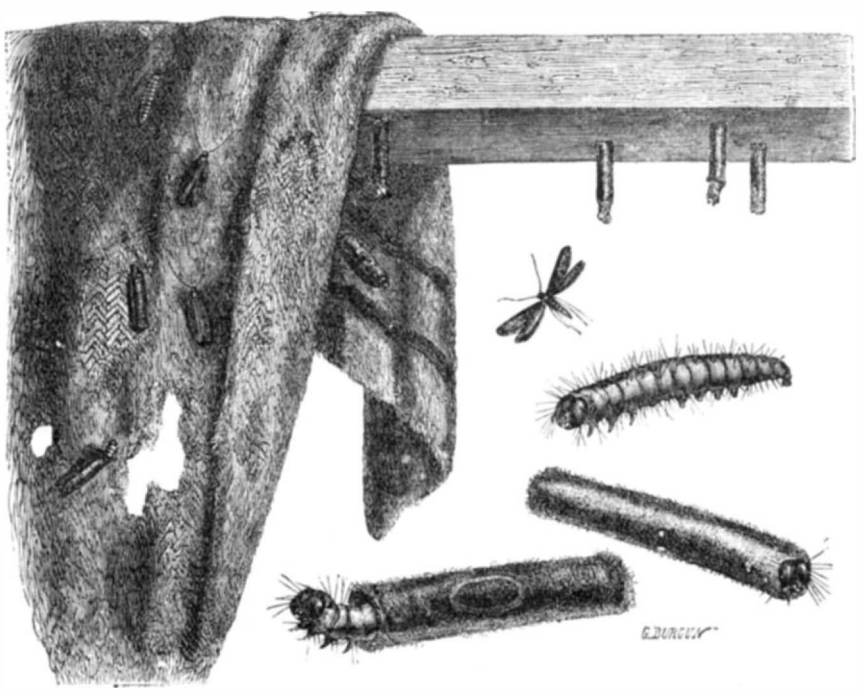
If you examine with a microscope the dust to which in great part you reduced the clothes-moth, you will find that it consists of feather-like scales that clothed its body and wings. Hence the name of the order, *Lepidoptera* or "scale-winged," to which the moths, sphinges, and butterflies belong. These delicate scales are often of the most beautiful colors, frequently burnished with metallic hues, and sometimes so exquisitely marked that the microscopist uses them as tests for the power and accuracy of his lenses. Of the moths or night-flying lepidopters, there are several families, each containing its hundreds or thousands of species arranged in a multitude of genera.

The clothes-moth belongs to a group consisting almost entirely of small species, and including those most minute members of the order which, from their minuteness, are known to the collector as the *Micro-lepidoptera*. The entire group was originally termed the *Pyralidæ*, from the Greek word *pyr*—fire—in allusion, it is said, to the attraction that a flame is to these insects; but this group is now subdivided into three families, for one of which the term Pyralids is retained; this is the family of the "snout-moths;" the second family is that of the Tortricids or "leaf curlers," so termed from the habit of the caterpillars of making their habitations by curling a leaf into the form of a tubular case; a family remarkable also as containing the genus *Hydrocampa*—moths whose caterpillars live in the water. The third family is that of the Tineids (from "tinea," a moth-worm), and is that to which the clothes-moth belongs. One may judge of the numerical importance of the Tineids from the fact that twelve hundred species of the family are known in Europe alone, and the sequel will show in a slight degree that their importance as pests to mankind is not even to be estimated by the vast variety of forms under which they appear—a variety which prepares us to expect to meet with every diversity of habit.

With the history of the clothes-moth and of the closely allied species which attack—one, furs and another, feathers, etc.—every one is but too well acquainted, and this history will be recognized at once in the accompanying engraving. Early in the summer the moths are seen fluttering about our houses, seeking their way through chinks and crevices into our closets and chests. Here they lay their eggs in the fabric which is to serve for food for the coming larva. The little stranger, when hatched, soon makes itself at home, building around it a tube with fragments of the material upon which it feeds. In this portable case it dwells and rapidly increasing in size, lengthens it as required by adding to each end, and from time to time enlarging it by opening it lengthwise and inserting fresh strips of material. Its period of growth completed, it attaches one end of the case to some convenient object, and passes into the chrysalis stage, in which it may remain till the following spring, when it undergoes its final transformation into the sexual moth.

Numberless have been the receipts prescribed for preventing the depredations of these insidious destroyers. Camphor, pepper, tobacco, benzine, corrosive sublimate, and the use of such woods as Spanish cedar and camphor wood, have each their value. We have found, when practicable, the common plan of carefully wrapping the fabrics up in newspapers with camphor inclosed, to be as effective as any, but frequent exposure to light and air, is especially distasteful to these little "imps of darkness." Closely allied species attack carpets, and even books are not sacred from them; while more than one kind work frightful ravages in grain stored up in granaries. Out of doors other Tineids lay their eggs upon flowers and the leaves of trees; the grubs of some of these make themselves portable cases of the skin of the leaf, while others have earned the title of "leaf-miners," from their habit of burrowing into the substance of the leaf.

From the nature of their habitation the smallness of the occupant may be inferred, and the patterns produced on the leaves by these creatures, must often puzzle the observant individual who is guiltless of the folly of being a "student of bugs!" But let such a one invest the affected leaves with a net of fine muslin, and he will presently find emerging from these thread-like burrows, a flight of miniature beauties, not larger in the body than the point of a coarse pin, and whose outstretched wings will scarce reach half way across his little finger nail—so small, in fact, that a single hazel leaf may harbor more than thirty full-grown grubs! With a lens he will discover that the wings of these atomies are either of the most delicate shades or else gorgeous in color, but generally flashing with streaks or specks of gold and silver luster, and always bordered by long fringes of exquisite fineness. The observer, astonished at his discovery, will be tempted to ask: Why this waste of beauty upon things so small that we all-important men cannot enjoy the sight of it without artificial aids; that mankind, in fact, has lived in utter ignorance of it till within the last few decades? Is it possible that the beauties of nature are not created for man alone, or even, directly, for man at all? May not these particular beauties be developed for the advantage of the moths themselves? May not these tiny dandies and fairy-like flirts, find such attractions and counter-attractions in their velvety vestments and spangled ornaments, as do the promenaders on Fifth avenue on a Sunday morning? Or, may not the luster of these hues assimilate the moths, in the glare of the sunlight, to the surfaces on which they rest, and so preserve them from destruction? Or even, on the other hand, may it not happen that when the race has played its part in the history of life, its very exuberance of beauty may be a fatal gift—causing its extinction, by attracting to it the easy notice of some exterminating foe? We are not of those who hold that these secrets are hopelessly inscrutable; much less that they are not to be pried into without profanity. Eyes were given to man to see with, and brains with which to reason, and he may make a much worse use of either than in admiring the charms and speculating upon the history of even such insignificant objects as the clothes-moth and its beautiful allies.



THE TAPESTRY MOTH.

Pepper.

Pepper possesses this peculiarity, that while its production is limited to a small extent of the globe, it is in universal demand, both among civilized and barbarous nations. The taste for this spice is no affair of caprice or fashion, and consequently its consumption must increase in the ratio of the facility and cheapness with which the cultivator and the merchant can supply it.

The quantity already produced per annum is 75,000,000 pounds—namely, from Java, Sumatra, Borneo, the Malayan Peninsula, the Moluccas, and various regions lying on the east coast on the Gulf of Siam. There is, generally speaking, abundant room for improvement in the culture; what is especially required, however—and we speak particularly with reference to India—is a larger application of European capital. When the price is high, a large extent of suitable land is at once put under culture; but no sooner does the price decline, than no care is taken to replace the exhausted plants or to enrich the impoverished soil, and the cultivation is not only neglected, but pepper districts wholly disappear.

The quantity of pepper we have given as the aggregate yield may appear enormous; but the amount named, if distributed among the inhabitants of the globe, would scarcely afford to each a grain a day. Unskilled cultivation is not the only fault connected with the production of this spice. The avidity of cultivators and dealers to bring pepper to a market frequently tempts them to pluck it before it is ripe, and from this cause it turns out light, hollow, and ill-flavored.

For years after the discovery of the Eastern Archipelago, pepper was the principal article of export to Europe. It is narrated that Vasco de Gama loaded two vessels with this article at the Spice Islands in twenty-four days. The first stimulus to the Eastern trade, now being so persistently pushed by the Americans, was by the success attending the fitting out of vessels from Boston to what is known as the Pepper Coast. The trade is now wholly in the of hands Europeans and Americans.

The Human Body.

The muscles of the human jaw exert a force of 534 lbs. The quantity of pure water which blood contains in its natural state is very great, it amounts to almost seven eighths. Kiel estimates the surface of the lungs at 150 square feet, or ten times that of the external body. The blood is a fifth the weight of the body. A man is taller in the morning than at night to the extent of half an inch or more, owing to the relaxation of the cartillages. There is iron enough in the blood of forty-two men to make a ploughshare of twenty-four pounds or thereabouts. The human brain is the twenty-eighth part of the body, but in the horse the brain is not more than the four-hundredth.

LIQUEUR DE LA GRANDE CHARTREUSE.—According to Dr. Chevalier, the celebrated liqueur, made at the Abbey of the name, near Grenoble, is composed of: Essence of *melissa citrata*, 2 grms.; essence of hyssop, 2 grms.; essence of angelica root, 10 grms.; essence of best mint, 20 grms.; essence of nutmeg, 2 grms.; essence of cloves, 2 grms.; and 2 liters of rectified spirits of wine, of best quality. The liquid is artificially colored with turmeric or any other suitable material

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Apparatus for Drafting Clothes.

The accompanying engravings illustrate a novel device for drafting pants. The engravings are not intended to represent any particular style, but to show the principles involved and the mode of operation. The apparatus is constructed so that the transverse wands, B, C, D, and E, can be set, the perpendicular wand, A, producing length measurements, while they carry with them any breadth measurements required. Thus, as is represented in Fig. 1, if the waist is 10 inches high, and the inside leg measure is 12 inches to the knee, and 28 to the bottom, the waist wand, D, sets upon 10, the knee wand, C, upon 12, and the bottom wand, B, upon 28. Now if the person measures 30 inches around the waist, and 36 inches around the hips, and the knee of the pants is desired 18 inches and the bottom 18, lines drawn from the said figures in their respective places, from point to point, produce the correct outlines for the front of the pants. It now only remains to curve and shape as the style may require.

Fig. 2 represents the reverse side of the same instrument, and scaled as is required for the back of the pants, which is laid out in the same manner as the front, but is produced independently therefrom, and may be cut first if desired.

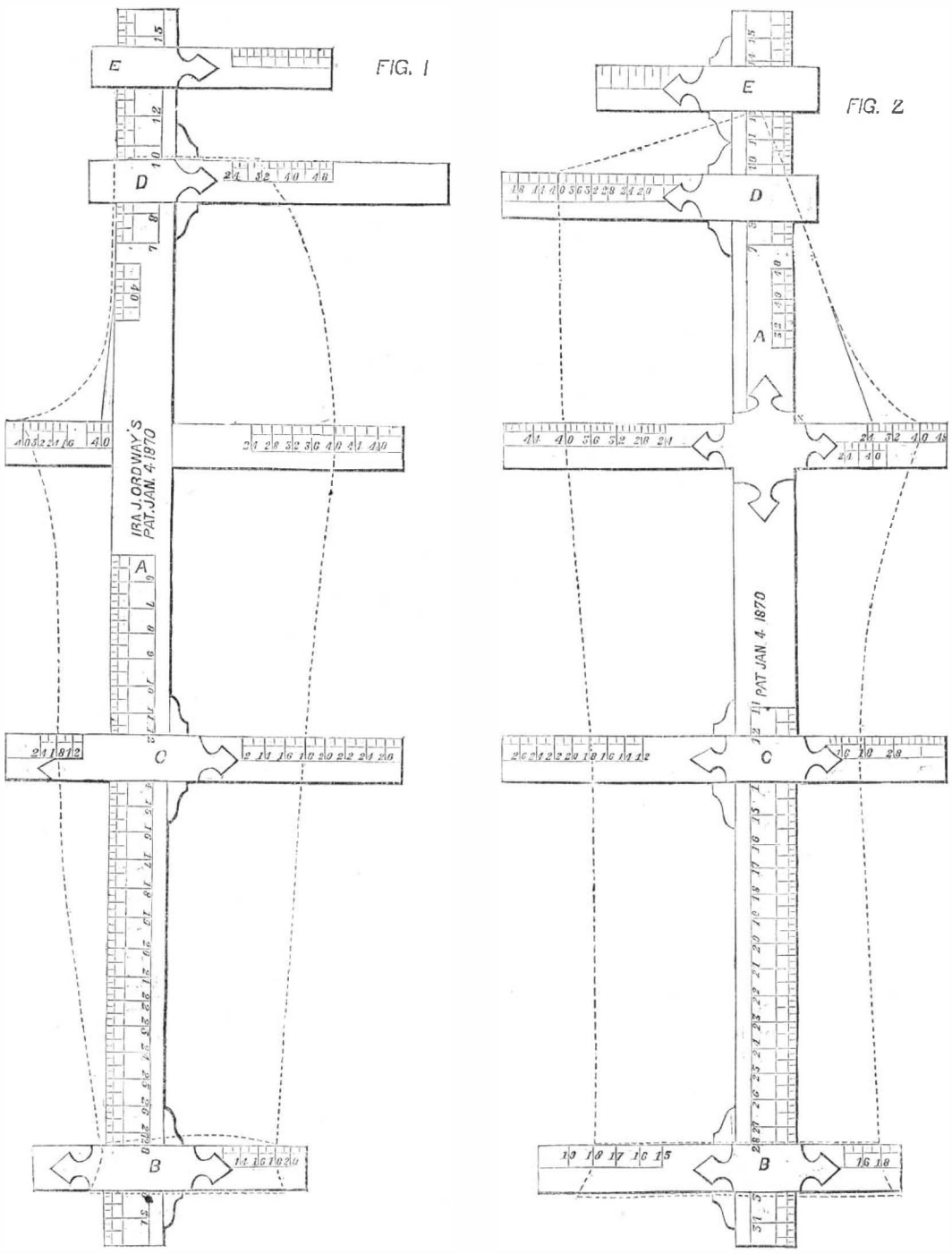
The movable wands are supported by elastic packing, which keeps them in the correct position at all points, and renders them self-supporting and self-fastening, yet allowing their easy movement.

The inventor has also devices for coats and vests, upon similar principles, and covered by the same letters patent. These, as well as the pants', are founded upon the fundamental principles of the art, and are not affected by changes in style.

The apparatus is based upon the celebrated "*Rouwel system*" combining actual measurement with the breast measure rule, thereby detecting errors and applying to disproportions.

Mr. Rouwel, whose extensive experience and reputation entitle his opinion to due consideration, states he has examined this apparatus for drafting gents' garments, and considers it the best invention for the purpose extant. It is based upon his system, which is practiced by thousands of the best cutters in the land, and it cannot fail to give satisfaction.

This invention was patented, through the Patent Agency of the SCIENTIFIC AMERICAN, Jan. 4, 1870, by Ira J. Ordway, of West Edmeston, N. Y., to whom inquiries may be addressed.



ORDWAY'S APPARATUS FOR DRAFTING CLOTHES.

How Broadcloth is Made.

We find in Morgan's *British Trade Journal* the following comprehensive summary of the various processes by which wool is made into broadcloth:

"The better to manifest what woolen is not, let us see what cloth is. Stage by stage, from sheep's back to gentleman's back, we will trace its history. The wool being shorn, goes to the stapler's, and by him is sorted. It is neither long nor short, and, for the cloth manufacture, if wool be not moderately short, it must be shortened artificially. It is next well oiled and spun into thread or yarn, then woven into a tissue that will be cloth by-and-by, though a long way distant from cloth when it leaves the weaver. The tissue, if examined at this stage of manufacture, would display its threads just like madam's stuff gown does. A coat of this material would be threadbare all over, despite its newness. Before this material can become commercial cloth, five chief things will have to be done to it. Its texture must be closed; it must be shrunk—that is to say, it must be cleansed; a nap must be put upon it; superfluous nap must be shorn off; finally, it must be hot-pressed. First, as to the closing or shrinking. If we bear in mind what has already been stated about the quality of felting possessed by wool, due to the presence of certain saw-like teeth, the reason of shrinkage will be understood. To accomplish this is the fuller's task, and he goes to work as follows: He takes the material to be shrunk, wets it, soaps it, and submits it to the fulling-mill for a considerable time—seven or eight hours—under which operation the shrinkage is effected. The fulling machine is an engine so contrived that certain heavy piles or hammers are brought to bear upon the texture, already soaped, wetted, and laid in a trough. The hammers are so fixed in the machine that not only do they fall upon the texture with heavy thuds, but at the same time turn it about, each stroke being delivered on a fresh portion. Now, bearing in mind the saw-like teeth, and the quality of felting what happens will easily be understood. The wool fibers are well soaped, as we already know, and but for their serrations all looking one way, they would slide upon each other in various and irregular directions. Practically, however, they can only slide one way—namely, with the roots foremost. The result is that the saw-like teeth catch among each other, at every catch making the wool fibers shorter, whereby the entire texture is shrunk, and, of course, proportionately closed up and thickened. This result being accomplished, the workman clears away the soap by means of fuller's earth and water, the fabric remaining still in the trough, and still wrought upon by the fulling hammers or piles. Being taken from the fuller's mill, the shrunken material has next to be dried. This is done by hanging it on tenter hook stuck into the margins of the texture at convenient distances. Obviously, this is an operation that would admit of considerable deceit in dishonest hands. The wet fabric might be injuriously stretched—made broader and longer to the prejudice of material. Formerly the exact amount of stretching to be used was regulated by Act of Parliament, so important did the matter seem. Well, our material, woven, fulled, and dried, is not cloth yet, though a considerable way advanced on its road to cloth. It has no nap, so the next process will be in imparting a nap to it. Let us suppose, now, by way of introducing the nap-imparting process, that a piece of our material having been laid flat on a board, a cat gets on it and scratches it. Puss would get a sort of nap on our material, though she would deal with it somewhat roughly. If the scratching effect of cats' claws were such as the clothworker required, he might imitate the operation by some sort of wire-tooth machinery. Altogether too violent it would be; for, although nap is really scratched up out of the threads, this is effected by little hooks incomparably finer than the claws of any cat—finer than any hooks man's ingenuity has enabled him to devise, the agent used by clothiers of to-day, as by the Romans, being the hook-like growths of the *Dipsacus fullonum*, or fuller's teasel. This plant, in growth, is something like a thistle, though, botanically, it differs from a thistle. It bears round heads, each about the size of a small apple, and studded all over with fine hooked protuberances. Many of these teasel-heads, being packed together and bound up tight on a flat surface, make a sort of comb, or currycomb, and this was the invariable way of packing teasels for use in cloth manufacture once. They may be also packed on a cylinder, but however arranged, their use in getting up nap out of threads will be obvious. Caused to rub against the incipient cloth, they scratch out little odds and ends of wool, and produce a hairy surface. One stage further, then, our woven material has advanced on the road to perfect cloth, but it is not cloth yet. The nap just scratched up by the teasel hooks is of all lengths, within certain limits. The manufacturer wants an even length, which he accomplishes by shearing. Next follows hot-pressing, which being done, we regard the cloth as made.

The Divers' Visit to the Oneida.

On the 24th day of February, the "borrowed" steamship *Aroostook*, with Charles and J. S. Lougee, practical and experienced divers from San Francisco, went to where the *Oneida* lies in 123 feet of water. After the usual preparations had been made, and, by sounding, it was ascertained that the deck of the *Oneida* was 103 feet beneath the surface of the bay; after every caution had been given to eight strong sailors to keep the air-pump in constant motion, and allow not an instant of time of stoppage to occur, as thereby depended the life of the bold diver; after Charles Lougee had been helmeted and shut from air, except that supplied through the slender tube of coiled rubber, with a life-line around his body and leaden clogs to his feet, with "Good-bye" and "God bless you" from all aboard, he was dropped over the side, and slowly disappeared in the blue waves, while a nervous tremor shot through our frame as we realized the fearful risk undertaken by that man who was seeking for truth in over 100 feet of water.

Away to the leeward, borne by tide and wind, came floating bubbles to the surface—life signals from below. The men at the pump were laboring manfully, but, becoming fatigued, attempted to change for fresh hands, and there was a stop. "Great God! you will murder my brother! Quick! for heaven's sake, quick!" And as the men recommenced the revolutions of the air-pump, the elder Lougee, with blanched face and trembling lip, gave a signal on the life-line below. For an instant there came no response, and the face of that brother seemed to turn to marble; but then we saw two quick motions from the submarine station, and knew it was the welcome signal of "all right," and then Lougee turned to the man at the wheel, who came so near sending both below, and simply said: "My only brother's life depends upon your efforts in keeping that pump in motion—stop again at your peril." The calm face and passionate eye told these men not to stop again, and, with Lieutenant Tanner close by, they kept at work until stopped by orders from Lougee.

Meantime, while we were on the deck of that "sand-pan," counting the tedious moments which lengthened to half an hour, Charley Lougee was searching the *Oneida* at the tremendous depth mentioned. At last came the signal for "surface," and instantly the life-line was put in motion: slowly came the coiling hemp and rubber on deck, and at last, away in the deep blue waves, came in sight the diver, shrouded and panoplied in weird garments. As he came to the surface he reached Minister de Long a sword and a lackered box, and then was his helmet loosed, and our party crowded around to hear of the gallant ship. Among our party were many of the survivors of the *Oneida*; among them were William Crowninshield, Captain Clark, Master Yates, and Dr. James Suddard, who were intensely excited to hear the tidings.

Said the diver—"The water for the first seventy feet was quite clear, as the sun gave excellent light, and although my supply of air was once choked for an instant, I reached the deck of the ship just astern of the mizzen-mast, and close by the mess-room hatch; the tide was ebbing quite strong, and I was compelled to hold to lines from the rigging to keep from being swept forward. I first examined the side of the ship; she was cut from the mizzen-rigging (at an angle of about forty degrees) across the whole stern of the ship, her timbers, far below the water-line, being crushed and broken, the Captain's cabin cut in two, the wheel and steering gear all carried away, and, in fact, the whole side and end of the ship, stove in or cut away. The ship is heading southwest, and sits upright on the bottom, and is making sand slowly. I laid down on the deck, and peered over the broken end into the cabin, but did not dare trust my air-line in contact with the jagged timbers. The guns and armament, except one, are all in place aft; but I did not go forward, as I was afraid of entanglement in the rigging." Turning to Crowninshield, he said: "Your evidence, which I read, described almost exactly the injury, except that she was cut deeper than you could have known." Lougee expressed the belief that it will be impracticable to raise the ship, but that the splendid battery, personal effects, etc., can be saved if the Government sees proper.

By this survey the testimony of the living is verified, and the memory of the dead without a stain, for the position of the ship was found; and the positions of both the *Oneida* and *Bombay*, as testified to by the navigating officers, shows that it was impossible for the Captain of the *Bombay* to have seen the red light of the *Oneida*, and that the order of "Port your helm," by Captain Eyre, was wrong, and the "Starboard,

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hard-a-starboard" of Master Yates was right.—*Correspondence of the Sacramento Bee.*

Correspondence.

The Editors are not responsible for the Opinions expressed by their Correspondents.

Buzzing Up.

MESSRS. EDITORS:—In your issue of April 16, I observed a communication over the signature of "C. H. Ladomus," asking an explanation of the singular experiment detailed therein.

Many years ago, while a boy at school, I was in the habit of witnessing, and p rticipating in, the feat referred to, almost daily. Since then, I have seldom seen it performed, but have never ceased to speculate upon the extraordinary features it presents for consideration. However, I have neither succeeded in evolving an explanation from my own mind, nor have I come across any in the course of my reading, or in conversation with others.

My purpose now is, not to suggest an explanation of this strange phenomenon, but rather to call attention to certain (what I may term) historical references thereto.

The first work, in point of time, containing such a reference is the diary of either old Samuel Pepys, or John Evelyn—both of whom lived and wrote in the reign of the merry Charles II.

Not having the books by me, I cannot tell which of the works named mentions the experiment, but one of them most certainly does. The author speaks of having seen at a monastery in France, four small girls raise the body of a great heavy man on the very tips of their fingers. The experiment, as detailed, conforms throughout to those which I often witnessed at school. He then tries to suggest an explanation, but fails to furnish any more satisfactory than that of witchcraft—which, however, he is induced to forego in consideration that the girls were being religiously educated, and were too young to have dealings with the Father of Lies.

The only other notice I have seen in books is found in Sir David Brewster's work on "Natural Magic." Sir David Brewster mentions having seen the feat performed by certain naval officers, who had learned it from the officers of an American ship in the Mediterranean. He suggests no explanation, and, indeed, seems to regard it as inexplicable.

I will add here, that whatever may be the *rationale* of it, there can be no earthly doubt of the fact of the phenomenon.

When the experiment is properly performed, the recumbent body is raised with the apparent ease of a feather. I have seen it, when I thought that the body even went up beyond the reach of the fingers of the operators. Considerable practice, however, is required to enable the performers to inhale and exhale in strict unison, for without this the experiment fails, and what ought to ascend like a feather, becomes like so much lead—a dead weight on their hands. It is even said, and I think truly, that if one of the four or six (for the number need not be restricted to four) be out of time, his part of the body will lag behind.

It is so long a time since I saw the experiment successfully performed that I cannot be absolutely certain that your correspondent gives the inhalations and exhalations in their proper order. I think, however, that he does. The best way to insure unity of action is to let the person to be raised give the signals by clapping his hands together. One fact must be borne in mind, namely, the performers must be in contact with the person who is to be raised; that is, they must actually touch him, or his clothing, for if he lies on a board, and they touch only the board, the experiment will inevitably fail. This is one of the features that render the thing so extraordinary. M.

Nevada City, Cal.

Very Curious Electrical Phenomenon--Explanation Wanted.

MESSRS. EDITORS:—I have observed in the shop in which I work a phenomenon which I would like to hear explained. There are two belts which run the fan for the foundery furnace, which on a dry day will emit electric sparks to the knuckle when held close to it. But what is incomprehensible is, that an oil-can with a small nozzle held 2 to 4 feet from the belt while running, will eject a small stream of oil horizontally towards the belt as if driven out by a considerable force.

While the belt is running downward with considerable velocity, the oil moves in an almost horizontal line, and therefore is not drawn, as might be supposed by the downward current of air caused by the downward motion of the belt, but drawn towards it, as if by attraction.

What is the force that impels the oil, and where does it reside? SERENO S. LUKENS.

Rock Falls, Iowa.

Drying Timber.

MESSRS. EDITORS:—I see in your valuable paper an article on the subject of drying timber. As the last clause of the article invites discussion I would say that I don't propose to give a better or quicker way of seasoning timber, but to give an idea or two derived from my experience for over twenty years.

A point which the writer of the article referred to has left out is the time to get out or prepare the timber for drying. The time for getting out timber for any purpose, or any kind of timber, in this section of country, is from the 15th of May to the 10th of June. I would say in the Northern States it would do something later, say from the 25th of May to the 1st of July. The question will be asked why I select this particular time for preparing timber. My answer is that it is a time when the sap of the tree is in full flow, and when the timber is cut the sap runs out at once like water. It is thinner at the time mentioned than at any other time of the year, consequently the timber shrinks and dries faster than when got out at any other season, and it will be harder, firmer, and more elastic, as the timber is in full growth at this time. It will be the clearer of sun cracks, and less liable to attack from insects.

The timber when prepared should be put in the shade to dry if possible. When dried in this way it needs no boiling or steaming except to bend it. When the getting out of timber is delayed beyond the time mentioned, the sap stops flowing, and it gets so thick it can't escape from the cells, consequently it has to dry in the wood, and it takes a long time to dry. Timber prepared in this way will dry more, and be better timber when dried, in four months, than it will be in two years when got out in the winter. It is better for ship-building or any kind of work you may wish to put up. If some of your correspondents will please try this plan of preparing timber for drying they will find it better than any other.

Griffin, Ga. A. A. PORTER.

[For the Scientific American.]

RECENT ADVANCES IN ELECTRIC SCIENCE.

BY C. WIDEMANN.

NEY ELECTRIC BATTERY.

This battery is composed of a vessel containing hydrochlorate of ammonia in saturated solution with an amalgamated zinc plate plunged therein; also a porous cup filled with carbonate of copper having a copper plate plunged into it.

This new battery can be established at little cost, and in order to maintain its power, it needs only a few pieces of sal ammonia added from time to time.

The carbonate of copper is insoluble in the solution of hydrochlorate of ammonia; but in closing the circuit the hydrochlorate of ammonia decomposes into hydrochloric acid and ammonia, the first going to the zinc pole, and the other to the copper pole; the carbonate of copper becomes then soluble, and its solubility produces a secondary current of the power of a Daniell's battery.

For military telegraphic purposes, in order to render this battery transportable, the solution of sal ammonia can be replaced by sand impregnated with the same solution.

DEVO'S NEW ELECTRIC BATTERY.

This very simple battery has been quite lately adopted by the Belgian telegraphic administration to work on an important line; in consists in a cylindric vessel divided into two parts by means of a piece of gas carbon. In one of the parts a mixture of pulverized sal ammonia and coke is placed, and in the other part a zinc plate.

This battery is set in operation by adding pure water to the two compartments; the zinc decomposes the ammoniacal solution to form chloride of zinc. The positive pole corresponds to the graphite blade, and the negative to the zinc blade.

This battery is more powerful than the sulphate of copper battery.

SECONDARY BATTERY OF GASTON PLAUTE.

When the two metallic plates which have been used to decompose water by a battery are joined together by a conductor, a secondary current is obtained, called the current of polarization.

The intensity of this current varies according to the substance of which the plates are made, and its maximum action takes place when leaden plates are used.

This last property has been discovered by Mr. Gaston Plauté, who has constructed a battery in which he takes advantage of this polarization current.

A gutta-percha cup, of a parallelopipedic form, contains six lead plates, separated from each other by a free space, and the even-numbered plates are put into communication with one of the conductors, and the odd-numbered plates with the other conductor. The gutta-percha cup contains water acidulated by sulphuric acid.

In attaching to the two conductors the rheophores of a small Bunsen battery, the current passes through the acidulated water and decomposes it. The positive leaden blades, where the oxygen is sent, are very soon coated with binoxide of lead. This latter having a great tendency to decompose water by its avidity for hydrogen, which action is the reverse of the electrolytic action, it happens then very soon that the decomposition of the water into its two elements, hydrogen and oxygen, ceases very rapidly.

Then suppressing the Bunsen battery and rejoining the conductors to which the two systems of lead blades are attached, a current of a larger intensity than the one formerly used is obtained.

In using two lead electrodes having a double surface of 2 square meters, Mr. Plauté has obtained similar results to those produced by 70 Bunsen cups of 8 inches in hight.

With the six leaden blades (having a dimension of about 20 to 22 centimeters) of the battery we have just described, a large steel knitting needle is melted by having this polarization current passed through it.

To obtain results of quantity and tension as desired, Mr. Plauté disposes near each other 40 gutta-percha cups, containing the acidulated water, in which 20 lead plates, about 7½ inches square, are dipped. These blades are joined as above described by even and odd numbers, and the battery is worked as described to obtain results of quantity; but to obtain results of tension a peculiar commutator is used, joining together the lead blades in the following order: No. 2 with 3; No. 4 with 5; No. 6 with 7, etc.

In joining the two extremes, a current capable of an enormous resistance is obtained, enabling a platina wire of two meters in length and ¼ of millimeter diameter to be brought to a red heat. An iron wire burns immediately, and an intense light is obtained from a metallic point over a surface of mercury; also in putting in contact two carbon points.

As it has been seen, this secondary battery is to the battery which charges it what the Leyden jar is to the ordinary electric machine.

Interesting to Silk Growers.

M. Guerin-Meneville, states in the Bulletin of the *Societé Imperiale Zoologique d'Acclimatation*, that in the last two years, the *Bombyx Yama-mai*, or Japanese oak-feeding silkworm, has been successfully reared on a large scale, in Austria, by Baron de Bretton, of Vienna. His last year's crop was 14,000 cocoons. In France they have not succeeded so well. M. Guerin-Meneville hopes, however, yet to produce from their oak forests a silk nearly as handsome, at a much lower price than that of the ordinary mulberry silkworm. The Council of the Paris Acclimatation Society have taken measures to procure for distribution among their members cocoons of some of the North American silkworms, which seem to merit attention. Among these are *Attacus Polyphemus*, which produces a round white cocoon, of which about fifty-five weigh a pound. It feeds on the oak, cephalanthus, poplar, hazel, quince, and maple. The *Attacus Cecropia* produces a yellow cocoon nearly as large as a hen's egg. It feeds on all species of trees, but especially on the elder; it is very easy to rear. The *Attacus Promethea* produces a very small cocooon, of which there are 200 to a pound. It feeds on the cephalanthus, poplar, barberry, sassafras, azalea, and plum. These worms can be reared in the open air, and are said to promise more success than many which have been cried up of late. They pass the winter in the cocoon form, and hence would have to be sent in that stage and not in the egg form. The butterflies appear in May, and their eggs hatch in from ten to fourteen days.

M. Duclaux has lately been experimenting on the effect of certain gases in retarding the incubation of silkworms' eggs. He has also been trying the effect of cold upon the same organisms, and finds that instead of retarding the period of incubation, it accelerated it; in fact, that eggs laid in autumn and left to themselves would only incubate in spring; but if subjected to the action of a freezing mixture for forty days, they would hatch into larvæ immediately afterwards, on being submitted to the action of a gentle heat. If these experiments are confirmed, M. Duclaux will have undoubtedly discovered an entirely new principle in physiology—that cold has a vivifying influence. Hitherto physiologists have always believed that its action was diametrically opposite.

Silk cultivators will be glad to learn that M. Pasteur proposes this year to carry out an elaborate series of experiments on the subject of silkworm growth, health, and nourishment. These experiments will be carried out on an estate of the Prince Imperial, situated between the Gulf of Trieste and Carnero.

Pure Air.

A beneficent providence has arranged that while the air we breathe gives us life by purifying the blood and imparting vital heat, its unfitness for these purposes is instantly determined by such disagreeable impressions on the senses, that we instinctively cease breathing, or hasten from the contaminated spot. Then again, from her bountiful stores, nature has provided substances which purify filthy localities and remove the nauseous smells. Some of these substances destroy the disagreeable odors but do not arrest decay, hence those odors would return constantly, as long as any of the substance remained which was the source of the evil.

Chlorine removes a bad smell from putrid meat, but it will return in a few hours. A London chemist has ascertained the fact that if a piece of fresh meat is coated with a substance distilled from coal and mixed with sulphurous acid, called carbolic acid, it will prevent the meat from decaying, and that such meat after being kept two or three months, is, if cooked, as sweet and fresh as meat just purchased from the butcher's stand; hence, chlorine deodorizes, that is, only takes away the bad smell for the present, but decay still goes on. Carbolic acid not only destroys the bad odor but prevents decay, arrests it, and is thus a deodorizer and disinfectant combined; it takes from a substance its polluting character, its power to make sick, to communicate disease. If further and more careful investigations and experiments confirm the statements made by Mr. Crooks, he is justly entitled to be named among the benefactors of the age. The practical lesson to be impressed on the mind by these statements is, that a deodorizer does no more than take away the ill odor of substance or locality, temporarily; a disinfectant not only destroys that odor but prevents its return, by changing that condition of the substance from which the odor came, in a manner which does not allow the process to go on which gave rise to the odor. A disinfectant also takes from a thing its power to cause disease. A contagious disease is that which is caused by actual contact, and cannot be communicated in any other way, as glanders in horses, and syphilis in men; infection is that which may be communicated by touching or handling the clothing, as itch, plague, measles, small pox; the air of a room in which these diseases are can communicate the disease, hence that air is infectious, that is, makes into, fixes, implants, thrusts into the body, the disease with which it is loaded. A real disinfectant deprives the air and the clothing of that power. It seems that carbolic acid is the most perfect deodorizer and disinfectant yet made known to man.—*Hall's Health Tracts.*

IT is said that peach blossoms are mostly double this season.

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THE HISTORY, SCIENCE, AND ART OF WHIPPING.

A very curious book has made its appearance bearing the following title: "FLAGELLATION AND FLAGELLANTS. A History of the Rod in all Countries from the Earliest Period to the Present Time. By the Rev. Wm. Cooper, B. A. London: John Camden Hotten, Piccadilly."

The Rev. Mr. Cooper commences with the Jews and Romans, and tells us how the scourge was used in public and private among the people of these nations. The Roman ladies must have been pleasant women to serve. He says:

"It was quite a sufficient excuse among the Roman ladies to whip a slave, if, as Juvenal expresses it, 'their nose displeased them;' in other words, if they were not satisfied with the state of their charms. Their wantonness of power was carried still further. It was a customary thing with some of them, when they proposed having their hair dressed with both nicety and expedition, to have the dressing maid stripped to the waist, ready for flagellation, should she be guilty of any fault or mistake in performing her task. The fair termagants at last carried these cruelties to such a pitch that in the beginning of the empire it was found necessary to restrain their license.

"During the reign of the Emperor Adrian, a lady was banished for five years for inflicting undue cruelties on her female slaves. The smallest faults, such as breaking glasses or over-seasoning dishes, exposed these wretched serfs to grievous whippings, which were sometimes inflicted in presence of guests who happened to be entertained at the table, as a means of affording a little diversion. The following is a literal translation of a passage from Juvenal, in which he describes the way an angry woman treats her slaves upon an occasion when her husband has slighted her: 'Woe to her waiting women! the dressing maids lay down their tunics, the errand slave is charged with having returned too late, the straps break on the back of some, others redden under the lash of the leather scourge, and others of the twisted parchment.'"

The author writes at length of the discipline practiced in convents, and gives a long description of a religious sect called the "Flagellants," whose religion consisted in flogging and self-torture, and whose practices, though curious, were extremely unpleasant to hear of. Under the head of penal flagellation there are one or two curious anecdotes:

"Cowper, in a letter to his friend John Newton, relates a droll incident which he witnessed at Olney. A young fellow, having been caught thieving, was ordered to be flogged through the town. As he performed this penal pilgrimage at the cart's-tail, the ruddy stripes upon his back stirred the compassion, while the fortitude with which he bore them excited the admiration of the spectators.

"But it turned out that it was an imposition on the public. The beadle, who was the executioner, wielded his whip with the utmost tenderness, and before every stroke drew the lash through his left hand, which was filled with red ocher, so that when he applied it to the culprit's skin it left an imprint like a bleeding gash. A constable, detecting the deceit, applied his cane to the shoulders of the beadle by way of exhorting him to do his duty. A country lass, pitying the pitiful beadle, assailed the pitiless constable. Thus the beadle thrashed the thief; the constable, the beadle; and the lady, the constable; and the thief was the only person concerned who suffered nothing.

"A young man, sentenced for some slight misdemeanor to be whipped through the streets of Glasgow, turned out, on being stripped, to be a female! She was identified at the time, by a mark on her shoulder, to be the daughter of a highly respectable merchant, who had run away from her home at a very early age, and been lost sight of for a great many years. After leaving her home she made her way to Port-Glasgow, and became cabin-boy in a West Indian sugar vessel. As her uncle was a town councilor at the time, she was pardoned the public exposure by the Lord Provost of the period, on condition of submitting to be whipped by the matron of the gaol."

The author gives "an old magazine" as the authority for the above story.

"The last whipping through the streets of Glasgow by the hangman took place on the 8th of May, 1822. On that day, at twelve o'clock, a strong detachment of the 4th Dragoon Guards paraded in front of the gaol, and at the same time a large party of police and civil officers attended, under the direction of the superintendent of police. Soon afterwards the culprit—a man sentenced to be flogged at the cart's-tail for assisting and encouraging a riot—was brought out of the gaol by the north door, and bound to the cart, which was in waiting. Parties of the dragoons were placed in front and rear to keep off the crowd; and when all was ready, the cavalcade moved round to the area of the south side of the gaol, where the culprit's back was laid bare by the hangman, who then gave him his first twenty lashes with a formidable cat-o'-nine-tails. The like punishment was repeated at the the foot of the Stockwell, and also at the head of the Stockwell; but the last twenty lashes, making eighty in all, were given by Thomas Young, the hangman, at the crowded Cross of Glasgow, the prisoner all the time groaning and lamenting his fate. 'This example,' says a commentator, 'had the most salutary effect; it taught the mob that there was a power over them after all, and there was an end of rioting.'"

In treating of the use of the rod in Eastern nations, the author takes occasion to speak of its absence in the Japanese schools. A ladies' school among the subjects of the Tycoon must be a pleasant place:

"A Japanese female finishing establishment has the following among other peculiarities—namely, all the masters pay for the privilege of teaching, instead of, as is the case with us, being paid for their lessons. This makes the instruction a labor of love. Then, again, to a certain extent, a Japanese young lady is allowed considerable freedom as to the selection of her instructors—she generally prefers the best looking. A lady principal of one of our English finishing establishments for young ladies would not be a little surprised, if she could be suddenly transported to Japan, there to study the peculiarities of Japanese customs. She would find herself, not in a close pent-up room filled with girls bolt upright, each perched upon an educational stool, but in a delightful garden, fragrant with the odor of tea and flowers. She would see a number of little summer-houses, embowered in the midst of those charming vegetable products for which Japan is so justly famous, brought to perfection by the most exquisite horticulture. She would see bright-eyed damsels, with cheeks pink as the roses, moving about with graceful steps, each bearing a small lacker tray with tea and cakes. She would see those damsels, with joyous smile and modest mien, wending each her way to a summer house. In each of the summer-houses she would see a master or professor, either waiting the return of one of the refreshment-bearing damsels, or else sitting by the side of one who had already come back. It is impossible for a stranger, new to Japan not to be struck with the peculiarities of an educational discipline so different from our own."

In a paper on the whipping of young ladies, bearing date nearly a hundred years ago, a curious punishment in vogue in fashionable boarding schools at that day is thus described:

"What would you think of having your pretty 'mouth plastered up for letting your tongue run too freely? Yet that was the punishment for talking in improper hours at Regent House. A broad strip of sticking plaster was put slanting across the lips, holding them fast together, and that kept on for many hours. It used to be one large piece put completely over the mouth and covering it; but one rather delicate girl was almost choked by the process, and it had to be discontinued."

If the queer correspondence which has appeared in some periodicals within the past two years be genuine, the rod is still extensively used in families and schools. Did space permit, we might quote whole columns of curious and interesting matter from Mr. Cooper's book. We may conclude our extracts, as he does his labors, with the following anecdote:

"A certain king had lost a much-valued falcon, on whose golden bells were engraven the *fleur de lis* and offered two hundred francs to the fortunate finder and restorer.

"A peasant presented himself at the palace door with the hawk, but the porter would not allow him to enter till he had promised him half his reward. Kings being easily accessible in those old days, the peasant soon came to speak with his majesty. Having caressed the bird and thanked the finder, Philip directed his treasurer to count out the two hundred francs.

"'That is not the reward I desire, please your Majesty.'

"'What else?'

"'Fifty lashes on my bare back.'

"'You are joking.'

"'By no means, I will take no other reward.'

"'Well, call the executioner and gratify him.'

"The peasant bared his back, and the lashes were administered; not very severe ones as may be supposed, the King having whispered to the officer to come down lightly. When twenty-five had been given, the peasant cried out 'Stop your hand, I have a partner who is to get the rest,' and he went on to tell of the porter's incivility and the bargain that had been made.

"The knave was brought in, and received his stripes, which were laid on with no light hand; and when all was over, it was an additional punishment to him to see the peasant passing out with his two hundred francs in a good canvas bag."

How Cigarettes are Made.

Our cotemporary, the New York *Mercantile Journal* prints the following description of the manufacture of cigarettes, which, like most articles published in that journal, is interesting and instructive:

From the days of Sir Walter Raleigh, in the Western world, and for ages and ages before he was born, in the oriental and barbarian regions of the earth, the narcotic fumes of tobacco have been indulged in by millions of the human family. Although the use of tobacco is, incontestably, among the most deplorable vices into which man can fall, it constitutes an important staple of production, particularly in our own country, and is quoted, crude and manufactured alike, among our most valuable commodities. Little by little, in the lapse of time, the cigar has encroached upon the use of the pipe, and may ultimately supersede it. In tropical countries, the cigar, in turn, has a formidable rival in the *cigarette*—that delicate, graceful little envelope, which in Spain and her old colonies is not disdained even by the lips and fingers of the fair.

So rapidly has the consumption of cigarettes increased within the last decade, that many large establishments, involving a heavy outlay of capital, have been started for their exclusive manufacture. As an example of this new and interesting side branch of industry, we may, without further particularizing, mention a very curious and celebrated concern now active at Havana, its transactions being based upon the main idea of perfect fair dealing in material, treatment, prices, etc. *Honradoz*—honesty—is a sounding word in the old Castilian tongue.

The concern to which we now refer was established about twelve years ago, on slender capital, and has now reached such extent of resources and efficiency that it turns out *three millions* of cigarettes per diem. It employs 300 hands inside, and 2,200 outside of the central concern, and among them are 50 little orphan apprentices. Most of these people are Chinese. They all wear a sort of uniform, consisting of a blouse or sack, a pair of striped pantaloons, and a cap on which are the marks of their position in the works, from the foreman down to the latest apprentice, and all are gradually instructed, step by step, in every process most recently known to science, assisted by the very latest improvements in machinery.

The tobocco used in the Havana factory comes chiefly from the small plantations in the western part of Cuba. When brought in, the first process is to place it on a sieve-table, set in motion by machinery. This sifts away all the sand and other foreign bodies from the leaf, twelve skillful workmen standing on either side of the table to snatch away all bad leaves or stems from the mass, as it travels along by the pressure of the mechanism. It is next thrown upon a huge ventilator, which winnows off the dust, and after that it is spread in thin layers on outside terraces, where the tropical sun can have full play upon it, and dry it thoroughly. It is then taken inside and dropped into huge casks, where it is subjected to intense hydraulic pressure, after which it is conveyed by an almost imperceptible motion, effected by means of series of screws, beneath a huge fly-wheel set with sharp blades, that chop it to pieces. Then it is again ventilated, winnowed, and subjected to the action of finer cutting apparatus, until it is reduced to the desired tenuity, after which it is spread out in the lower floor of the building, and besprinkled with an aromatic liquid, the composition of which is a secret of the manufacture. Chinamen alone are employed at this last stage, because their ignorance is regarded as a guarantee that the secret will not be betrayed.

The tobacco being once more partially dried, now requires only its paper envelopes. For these the material comes from Spain, and the Havanese cigarette maker imports 35,000 bales of it per annum. The paper is passed beneath a press, which stamps it indelibly, and is then submitted to mechanical scissors, which clip off hundreds of wrappers at a stroke.

The final process consists of the folding and packing, and these are intrusted to hundreds of hands, some permanently employed, some working in their own rooms outside, some inmates of charitable institutions, and even of prisons. In one saloon a visitor saw three hundred convicts, black and white, hard at work rolling the cigarettes delicately between their fingers.

Every workman gets a certain quantity of tobacco and wrappers, and must deliver a *round* of 5,000 cigarettes from it, with perhaps 50 over, which he is allowed to keep for his own use. For this amount of work he gets from the overseer a metal check, entitling him to the payment of one dollar, at sight, on presentation to the cashier or foreman. Everything, of course, is strictly controlled and checked, with all the aid of scientific arrangement and apparatus.

There is some smoking tobacco for pipes, pressed and put up in tablets, by the same concern, but to no extent comparable with the cigarettes. The articles once packed are adorned with all sorts of gilded and colored papers and fancy devices, the concern keeping its own lithographic and printing apparatus for that purpose. To such perfection, indeed, have the proprietors carried this subsidary branch of their operations, that the local Government has more than once requested them to execute its bank bills!

In conclusion, we may mention that the gas-lightning and water supply, as well as the drainage, ventilation, etc., of these factories, have been carried to perfection, and that by the steady application of energy, skill, and science, an enterprise that began with almost nothing has been raised to the point of supplying 1,000,000,000 of cigarettes per annum.

However we may reason with regard to the industrial and economical question involved in this application of high resources to the supply of a mere passing indulgence—and we admit that the debate would be a fair one—we cannot withhold the reflection which strikes us when we see so trifling a matter as the manufacture of a cigarette develop such important intellectual and industrial resources. This progress is one of the remarkable features of our time, showing how the minutest wants are converted into great forces, and the homeliest objects made subservient to the advance of useful invention and a species of refined taste. The same discoveries may, to-morrow, be applied to far loftier purposes.

An Ingenious Lunatic.

The *Pall Mall Gazette* tells the following story of a lunatic who recently escaped from an asylum in Ireland, and who was noted for his mechanical ingenuity:

"He could do things quite beyond what men in general can perform, and his cleverness was even exceeded by his versatility. He was a good shoemaker, a tailor, a weaver. He made from a scrap of iron a key by which he could open the door of his division. He put together a wooden sewing machine of his own contrivance, with which he made clothes for himself; and his mind just before his escape seemed so intent on improving this machine that there was little apprehension of his attempting to escape.

"His career, it is stated before he came to the asylum was most extraordinary. He had been in the British army, in the French army, in the French navy; and had been in British, German, and Russian prisons.

"He had a fair grammatical knowledge of French, he knew something of German, and was completely self-taught; his age, although he had passed the various phases of existence above described, was only twenty-seven."

STEPHEN, the famous guide at the Mammoth Cave, used to say that more visitors came from Europe to view that subterranean wonder, than from all parts of the United States combined.

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Improved Rotary Churn.

The churn family is a numerous one, and comprises, like most other old and large families, many "poor relations." Every attempt to dodge the principle of agitation to rupture the oil globulessuspended in milk or cream, and to substitute chemical for mechanical action, has proved more or less a failure; and churn manufacturers have been obliged to come back to first principles, relying for success upon perfection of details in the construction of the machine.

The aim of the inventor of the churn under present consideration has been to secure all the advantages of the rotary churn, and to eliminate so far as possible, any inconveniences hitherto pertaining to churns of this class.

Nearly all parts of the churn which come in contact with the milk or cream are made of wood, so that no corrosion can take place. The interior is made perfectly smooth, and is destitute of recesses and corners which it is difficult to thoroughly clean. The dashers are four in number, and perforated, so that they thoroughly agitate the liquid.

The general form of the churn is shown in Fig. 1. Fig. 2 shows the mode of attaching the crank. A bracket, A, is screwed to the body of the churn, as shown in Figs. 1 and 2. This gives two bearings for the short shaft, B, Fig. 2, which is kept in place when in use by a key, C, driven through a slot in B. The annulus about the shaft is closed firmly against leakage by a rubber-faced metallic washer, kept tight by a second key, D.

The end of the short shaft, B, is squared to enter a mortise in a plate, E, screwed to the dasher arms; and by tapping out the key, C, it may be withdrawn and the dashers removed, while the churn is half full of milk, if desired.

The inventor claims that this churn breaks the cream easily and makes good butter, and that it churns with ease, so that a small child can work it; that it will churn a small or large quantity equally well; that it is very convenient for putting in the cream, taking out the butter, and for cleaning after use; that the dasher can be removed at any time and the milk left in the churn, though it be full; and that the device combines all the merits of both the box and the barrel churns, with several advantages over both.

Patented, through the Scientific American Patent Agency, March 22, 1870, to C. Blust, whom address for further information, at Lucas, Ohio.

Fig. 1

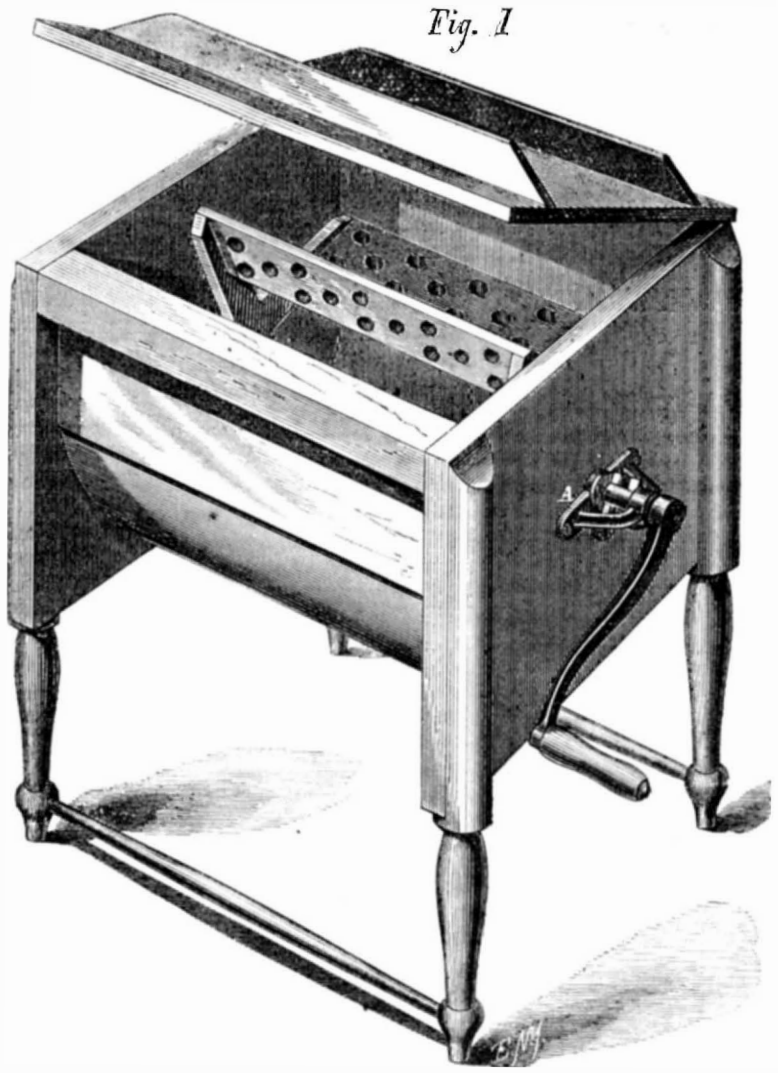
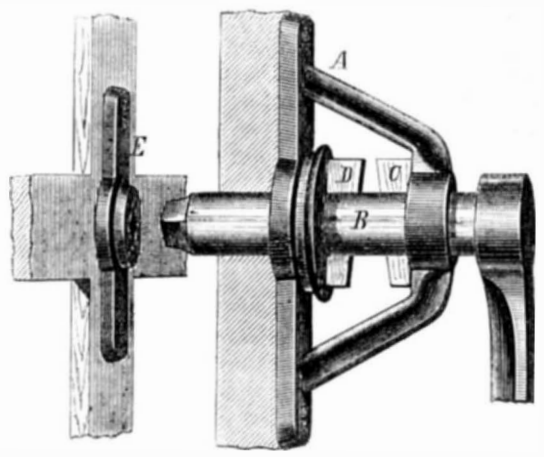


Fig. 2



BLUST'S IMPROVED ROTARY CHURN.

Improved Faucet.

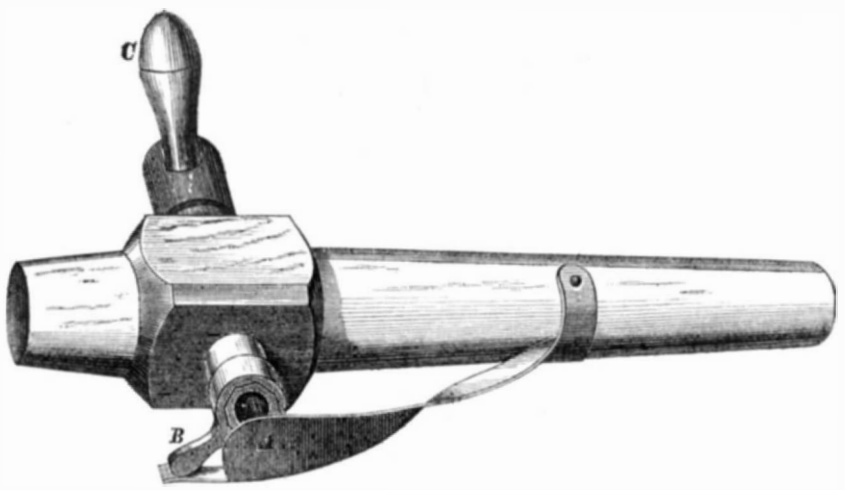
When faucets are left for some time unused, the lower end of the plug frequently becomes stopped and foul with insects and their webs, and it is not easily cleaned without loss of first flow of the liquid or being removed from the cask.

We, however, are able to give an engraving this week of a simple device which entirely obviates this annoyance, by cutting off all access to the end of the plug, except when in use.

A spring gate, A, is attached to the faucet, as shown, the part at A being so formed that when the faucet is closed it entirely covers and rests upon the end of the plug, so that the hole is entirely stopped. A lever arm, B, serves to force the spring gate to one side when the plug is turned by the lever, C.

This simple arrangement completely removes the difficulty specified, and as there it nothing expensive about it, or likely to get out of order, we judge it has a good prospect of coming into extensive use.

Patented, April 19, 1870. Address, for rights, etc., Joseph Heine & Co., 19 John street, Toledo, Ohio.



HEINE & VONFICHT'S IMPROVED FAUCET.

Improved Method of Fixing Colors on Fabrics.

The principle or basis of this method is that when gelatin, gum, or an analogous body is mixed with a solution of chrome salt, and the compound exposed to the action of light, it becomes insoluble in water, and so shuts in or fixes any pigment which may have previously been mixed therewith, making it a fast color.

The inventor, Mr. Kipping, of Manchester, England, availing himself of this known principle, prepares coloring matters for printing and dyeing by mixing them with gelatin, gum, or an analogous body and a salt of chromic acid, and then uses the colors so prepared in the usual manner adopted in printing and dyeing. The same end may, however, be attained, although not so completely, by dyeing or printing in the ordinary manner, and then subjecting the goods to a treatment with the chromatized gelatin or solution of the chromate.

In carrying out the method, the proportions of the substances employed may be varied. Gelatin of commerce is taken and dissolved in water, after which bichromate of potash is added in the proportion of, say 3 oz. to 20 oz. of gelatin; this operation should be effected in a room from which strong light is excluded. The proportion of gelatin to water will vary according to the consistence to which the printing color is to be brought, such consistence also being governed by the nature of the pigment employed; but these details will readily be arrived at by competent printers. The coloring matter is now added to the chromatized gelatin and so prepared. Any ordinary printing machine is made use of, and the goods subjected to the action of light, by the effect of which the colors become imprisoned, as it were, in their vehicle, and are not affected by the process of washing or other treatment with moisture.

The time required for exposure to the light will of course vary, as is well known in reference to mixtures of bichromates and gelatin applied to other purposes, a few minutes being sufficient in bright weather. This exposure to light, however, is not indispensable, as such compounds decompose by process of time without the direct action of light, although perhaps not so completely. The exposure to light may be left to circumstances, such as the sale or use of the goods, which will bring them under its influence.

In printing with colors prepared as above the mixture may be liable to gelatinize when the printing room is below a certain temperature. To avoid this the room should be heated to the required degree, and the color boxes kept warmed by a gas jet.

The Legitimate Gratification of Curiosity.

The principle of curiosity, says a writer in *Stewart's Quarterly*, is deeply implanted in the human mind, and from its exercise and gratification much of the enjoyment experienced in human life derives its origin. The increase of the sum of knowledge already possessed, and the efforts put forth to enlarge the field of intellectual contemplation awaken feelings of pleasure that exalt man above all the tribes of irrational creatures. Persons of cultivated minds pursue knowledge for its own sake. Intellectual treasures are prized, not for the mere purpose of increasing the number of facts with which the mind is already stored, but because they are accompanied with feelings of elevated enjoyment and satisfaction—furnish new materials upon which the understanding may exercise its faculties, and open wider fields to the creative powers of imagination.

The power of curiosity impels thoughtful minds to devote themselves assiduously to various branches of learning, such as literature, history, philology, or the various departments of art and science. The philologist experiences a pleasure almost as keen as that of the chase, while he pursues some lingual root through the various languages of Europe or Asia. The historian feels himself rewarded for his toils amidst the dusty tomes or manuscripts of a library, when he discovers some important but forgotten fact in the history of an individual or a nation. The artist pursues his labors with unceasing diligence for the very pleasure they yield him. So the student of natural history continually finds objects new and strange rising round him, inviting investigation and awakening interesting reflection. Some hitherto unobserved mineral or vegetable production, or vital form, meets the eye and invites him to study its life-history, its qualities, and its links of connection with other objects of the same class. He thus extends the series of organic forms with which he was previously acquainted, or fills up some gap that detracted from the completeness of his knowledge. The many seeming paradoxes in nature—the strange metamorphoses of insects—the peculiar forms of animals suiting them to the various positions they are designed to occupy—the changes produced on vegetable organisms by climate or atmospheric influences depending on temperature or elevation—the dependence of certain plants for their very existence upon the presence of certain insects, these and a thousand other subjects for examination appeal strongly to the curiosity of the student How strange the many adaptations and contrivances everywhere around us.

There is, for instance, a fly which deposits its eggs within the stamens of a Scrophularia, and secretes a poison which produces a gall, on which the larva feeds; but there is another insect which deposits its eggs within the body of the larva, within the gall, and is thus nourished by its living prey; so that here a hymenopterous insect depends on a dipterous insect; and thus depends on its power of producing a monstrous growth in a particular organ of a particular plant. So it is in more or less a plainly marked manner, in thousands and tens of thousands of cases, with the lowest as well as the highest productions of nature. The misletoe derives its nourishment from the juices of the apple and a few other trees, and its seeds are disseminated by birds. Its existence consequently depends upon the existence of both the few species of trees upon which it lives and the presence of the birds that scatter its seeds. The failure of either of these would result in its extinction.

Darwin tells us that in England the fertilization of the common wild pansy and red clover depends upon the humble-bees that abound in the neighborhood. "The number of humble-bees in any district depends in a great degree on the number of field-mice that destroy their combs and nests. Now the number of mice is largely dependent, as every one knows, on the number of cats. Hence it is quite credible that the presence of feline animals in large numbers in a district might determine, though the intervention first of mice and then of bees, the frequency of certain flowers in that district." The scientific investigation of nature gratifies the curiosity by lifting the veil from thousands of these connecting links that unite the different departments of natural history.

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To Advertisers.

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We give opinions free, and all we require is a rough sketch and description of the invention.

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THE CITY TRANSIT QUESTION.

Two questions press for immediate solution, both of them vital to the future prosperity of the city of New York. One of these—the coming pavement—interests all cities in common; but the question of transit in this city presents some features not found in connection with other cities, arising chiefly from the contour of the island upon which the city stands.

The lower part of the island, as far up as Fourteenth street, is now practically absorbed for business purposes. A short time only can elapse before a first-class residence below this street will be regarded as a relic of the past.

The vast concourse of people which daily moves to the lower part of the island and returns after business hours, together with the constant movement each way through the day, exacted by business requirements, has swelled the human tide to such a degree that its ebb and flow overcrowd all the present means of conveyance, so that the positive discomfort, as well as the demands made upon time in getting to and fro, has become intolerable.

A portion of the pressure is relieved by the Brooklyn and Jersey City down-town Ferries, which transport immense crowds of people to and from those cities; but when the rivers are crossed the tedious, incommodious, and crowded horse-cars are the only means available to the masses whereby they can reach their suburban homes.

These cities can never so draw the population from New York, that there will not remain a pressing need for far more capacious and rapid means of transit than exist at present.

Scheme after scheme has been devised from time to time, each professing to be the best, if not the only way, in which this difficult problem can be solved; but few have been backed by such capital of money and brains as to command public approval, or to secure such legislative action as could give even the uncertain existence which a charter can impart to a radically defective system.

To the end that our readers may know the way in which the various plans now pressed upon public notice are regarded by our most prominent and influential citizens, as well as those who have given this subject most careful examination and study, we have been at the pains to visit and obtain expressions of opinion from a number of gentlemen, which we now propose to lay before our readers.

OPINION OF MR. A. T. STEWART.

Mr. Stewart says that while none of the, at present, proposed methods of transit meet with his entire approval, that known as the Underground Railway is, he thinks, the most feasible of any. First, the route is a better one for a tunnel, and the promoters of that plan are men whose character and means are such as will insure its construction should it ever be commenced. The Arcade scheme he condemns in toto, for the reasons that the aggregated capital of the fifty-seven incorporators would not construct the road from the Battery to the City Hall park, and he is opposed to any and all tampering with Broadway above or below ground, for various reasons made known during his recent opposition to the Arcade Railway bill.

The Pneumatic Railway Company have by their admirable method of excavation shown that the work can be done without injury to the street, or obstruction to public traffic, and thus have weakened the feeling of opposition with which he at first regarded the project. But he still thinks that this plan cannot eventually pay, and that had it been supposed that the tunnel would be constructed of a size suitable for passenger traffic at the time a charter was asked for, the incorporators would not have got it.

The West side Elevated Railway he regards as a most ridiculous and hopeless scheme, so dangerous to passengers, and so expensive, that it never could, by a remote possibility, succeed; while it is a standing public nuisance, and would be declared such, were the courts to do their duty.

He regards with greatest favor a viaduct railway, similar to that in London, that is, an elevated way composed of mason work, with parapet walls. This railway should pass through blocks, and bridge over crossings. It should be erected on a line as nearly parallel to Broadway as practicable, and not too remote from it. Such a railway would be far less expensive than any other, and could be made of ample capacity. The first cost and current expenses would not be so great as to be incompatible with low fares.

Mr. Stewart expressed his views with a clearness and force to which this summary written from memory does feeble justice.

OPINION OF MR. WILLIAM A. WHITBECK.

Mr. William A. Whitbeck, President of the West Side Association, and a large real estate owner, has perhaps given this subject as careful a survey as any other man in the city. He has visited Europe expressly to examine the various city railways of London, as well as the systems of sewerage in London and Paris, and the celebrated asphalte pavements and other improvements of the latter city; his object being to gain such information on these important questions as would enable him to form correct opinions upon any proposed improvements of a similar nature in New York.

In our interview with Mr. Whitbeck, which lasted nearly an hour, he said very much more than we can find space to repeat, but we shall endeavor to give a fair epitome of his remarks.

Although he went to Albany expressly to urge Gov. Hoffman to approve the Arcade Railway bill, and submitted to His Excellency a memorial in behalf of numerous citizens to the same purpose, he pronounces the Arcade scheme a Humbug. Any seeming incongruity between Mr. Whitbeck's action with reference to the bill and his opinion, as thus expressed, is accounted for by the fact that he regarded the so-called Arcade Railway bill as really in effect a *tunnel bill*, and he regards the system of tunnels as the true solution of the question of city transit in New York.

His reasons for regarding the Arcade Railway bill, as practically a tunnel bill, are, that the words of limitation and condition imposed in the act require two consents by property owners, and one by Trinity Church, which consents never could be obtained for the arcade plan; but he thinks the bill contained ample provision for construction on the tunnel plan.

The arguments by which he maintains the entire impracticability of the Arcade scheme are numerous and forcible. We shall only give some of the most important.

First, he argues that although on the pictured plans which have been circulated, the excavation is made to appear as being only about seventeen feet feet in depth, and although it has been represented that this depth would be ample, it is absurd to think of anything less than twenty feet as the minimum depth, while in places it would need to be much more than that, to secure a sufficiently easy grade, and this depth of excavation immediately in front of the buildings would be ruinous. He maintains that proper arching to secure sufficient strength for the surface roadway will compel this depth, and that it can be dodged by no ingenuity.

The plan recently submitted by the arcade people, whereby they proposed to bridge the points where excavation is proceeding, he deems as utterly absurd and impracticable, and believes the projectors themselves share this opinion.

The proposed four tracks he also regards as absurd, as the inner tracks could only be reached by crossing the outer ones; which is not to be thought of where trains are passing in both directions, at frequent intervals.

The sidewalks and arcade shops and stores are also in his opinion a part of the absurdities of this scheme. No one could be induced to perambulate these subways, except when compelled by necessity, as the close proximity of frequently passing trains would produce a state of nervousness, if not of actual fear in most people, fatal to that pleasure which the promoters of the scheme have endeavored to make people believe would attend these subterranean promenades. The stores would be merely receptacles for carbonic acid gas, and customers would seek pleasanter places to transact their business.

Ventilation would in his opinion be extremely imperfect. He thinks it is a demonstrated fact—accepted as such by the engineers which have paid most attention to this subject—that a separate tunnel for each track is the only way to secure good ventilation where frequent open cuts are not practicable. With such tunnels the advancing trains act as pistons forcing out the air ahead of them, and by the partial vacuum produced behind them, draw in a fresh supply at each transit.

The Pneumatic Railway he thinks impracticable for passenger traffic for any but short routes, and claims that this has been demonstrated by experiments in Europe.

He regards all elevated railways as impracticable; first, because it is impracticable to secure the necessary legislative action. In considering the question of practicability of any plan, he thinks this is the first thing to be thought of, as the people will fight to the death anything which they think likely to injure their property. There can be no question that elevated railways will encounter the most determined opposition of property owners in any route proposed, and therefore they will always meet with such opposition as will kill them. Such was the fate of Swayne's three tier scheme, and such would have been the fate of the West Side Elevated Railway but for the peculiarity of the act under which it was constructed.

We shall resume this subject next week, and hope to be able to give expressions of opinion from other prominent men.

ADVANTAGES OF COMPRESSED ASPHALTE FOR ROADWAYS, AND THE PRODUCTION OF SOLID SURFACES FOR OTHER PURPOSES.

An American gentleman residing in Paris has furnished us with some important information relative to the use of compressed asphalte for public and private roadways, walks, etc., from which we draw the facts and conclusions embodied in this article.

Our readers will recollect an illustrated description of the process of preparing and putting down asphalte so as to form roadways as practiced in Paris, published not long since in this journal. The article was extensively copied in English journals, and the information it contains was obtained directly from Paris, together with the drawings from which our engravings were prepared. It appears from the information of which we are now in possession, that the compressed asphalte has by its incontestable advantages obtained the approval of all the engineers of the Municipality of Paris, and of a great number of provincial cities: in fact the hardest working streets of Paris are now paved with it, and the question is now seriously discussed in the Council of Administration, of extending the asphalte system to all the streets and boulevards. It is highly probable that this will be done as fast as the present road surfaces wear out.

It is so solid in wear that it is superseding granite paving even in places where this stone is abundant and cheap; as, for instance, in Geneva, in the very center of easily worked granite quarries, and Grenoble in the center of the French Alps. Both these towns have used and are using asphalte pavements extensively.

A very great advantage in the use of asphalte is the rapidity with which it can be laid. It is not unusual to construct five hundred square yards per diem, and the larger the undertaking the more rapid in proportion may the work proceed. The pavement laid is ready for use the next day, so that thoroughfares are not kept obstructed.

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The same is the case when repairs are needed, as they can be done in sections, each section being ready for use on the day succeeding repair.

Horses' feet and wheels of vehicles make scarcely any noise on this pavement, and it always possesses a slight elasticity, manifesting the latter quality rather more in warm than in cold weather.

It is kept perfectly clean by the use of besoms, and washing with hose, so that it produces neither mud nor dust; and, as it has no cracks or crevices in which animal or vegetable matter can accumulate and decay, its sanitary qualities are of the highest order.

We are informed that its first cost would be less than stone paving in nearly all countries, and that the cost of maintenance is very much less than that of Macadamized roads, and generally less than that of any other modern pavement. It is also stated that it is positively free from all the disadvantages of other pavements.

Slipperiness, which has been charged against it, is, we are assured, not essentially a fault of this pavement, it only being observable when mud has been carried upon the asphalte from adjacent Macadamized roads, and entirely disappearing when the mud is washed off.

It has also been objected that these roads need frequent repairs. On this point we are assured that complaints have only been heard within the last two years; and that they have had their origin in the imperfections of experimental pavements constructed of other and inferior material from that of the first-class asphalte roads. The material known as the asphalte of the "Val du Travers" was that originally employed, and has never given any cause for complaint. It contains a much larger proportion of bitumen than any other, and this renders it superior to other varieties for this purpose.

A preparation of asphalte, called liquefied asphalte, has been used for sidewalks, terraces, basement floorings, and yard pavement, and is highly recommended.

It is a mixture of bituminous calx or asphalte proper with purest bitumen, the latter serving solely to complete the fluidity of the asphalte, or, so to speak, as a flux for melting it. The mastic thus obtained is mixed again with a certain proportion of sand, and then run over the surface.

It is stated that the majority of cities in France have adopted this system, and that its use is extending to other countries. It has been employed in Paris since 1838. A single workman can put down from seventy to eighty square yards of this surface per day, and it is ready to be used two hours after it is down. It rarely needs repairs, and when necessary these are the work of only a few minutes. Used in this way it gives a waterproof and perfectly cleanly surface, and its use in sidewalks in Paris has shown an average duration of fifteen years for a layer three-fourths of an inch thick. It is very much cheaper than flagged walks, not costing more than from one-fourth to one-half as much, according to the quality of flags employed.

These facts seem to us worth considering in connection with the subject of pavements in this country, perhaps a question of as great present and general importance as any engineering problem of the time. That the importation and use of asphalte may be the solution of this problem seem at least possible enough to lead to thorough experiment in this direction.

PHOTOGRAPHIC EXHIBITION AND DR. VOGEL.

The photographers of this country propose to hold an exhibition at Cleveland, in June next, and have invited the president of the Berlin photographic Society, Dr. Herman Vogel, to come over as their guest. The invitation to Dr. Vogel was sent by cable and when he went to the Minister of Education to ask for leave of absence, this fact had much to do in securing a favorable reply. The Minister said that this was an honor that had not been extended to any member of the Cabinet, and he at once courteously accorded the necessary permission to Dr. Vogel to accept the invitation, and a response came back by cable—"I shall come."

No man has done more to add to our knowledge of the scientific principles involved in the science of photography, than Dr. Vogel. He has been a patient and original worker, and has contributed many articles on the chemical action of light, and on the re-agents to be employed to obtain good pictures.

It is to be hoped for the credit of the profession that photographers will unite in giving a suitable reception to this delegate from foreign societies. The opportunity is a favorable one for a more thorough organization of photographers into a society for the protection of its members, and for the elevation of the profession to the dignity of an art.

When the vice-president of the New York Photographic Society visited Berlin, a few years ago, a grand reception was accorded him, at which nearly three hundred of the most distinguished professional and amateur photographers of the city were present. Everything was done to honor America in her representative, and now that an opportunity offers to return the compliment, our best men must not hesitate to come forward with their hearty co-operation. Let Dr. Vogel have a reception worthy of the man and of the high condition of the photographic art in this country.

DEATH OF A DISTINGUISHED PROFESSOR.

Gustavus Henry Magnus, since 1831 professor of physics at the University of Berlin, born in Berlin, May 2, 1802, died in his native city, April 4, 1870. He was the cotemporary and intimate friend of Henry Rose, Gustavus Rose, Woehler, Ehrenberg, and Poggendorff, and was the brother of the distinguished portrait painter whose picture of Jenny Lind has been so frequently copied, and of the banker whose collection of works of art is so well known in Berlin.

Professor Magnus was an industrious investigator in the department of physics, and although he never contributed startling and grand discoveries to our stock of knowledge, was able to add much that was new and valuable. During the earlier part of his career, he devoted his attention to chemical analysis, but afterward following the example of Faraday, he applied himself to the study of electricity and physics. He accomplished much by the force of his example, by the encouragement he held out to young men, and by the judicious use of a considerable fortune, that came to him by inheritance. The University of Berlin has had few professors more highly respected, or more thoroughly useful than Gustavus Magnus; and his death will be deplored by a large circle of scientific friends, both in this country and in Europe.

CAPTAIN ERICSSON'S NEW METHOD OF SUBMARINE ATTACK.

Captain Ericsson seems to have a mind so prolific of ideas that he has scarcely time to put them in good working shape so fast do they succeed each other. Standing as he does in the very front rank of the engineers of his time, each successive invention of his fertile brain only adds to the evidence of his great ability as a thinker and a constructor.

It is, however, in naval engineering that his talents are most conspicuous, and his inventions most numerous and valuable. No sooner does he complete a monitor, seemingly impregnable to all known species of attack, than he sets himself about inventing a destructive agent that even iron-clad vessels will be as powerless to resist, as wooden vessels are powerless to withstand the battering of modern heavy artillery.

Captain Ericsson has published at length in English engineering journals and in the *Army and Navy Journal* an account of his newly devised system of submarine attack. The fundamental principles upon which it is based may be stated as follows:

It is well known that a ball fired from a gun, being acted upon by the projectile force, the resistance of the air, and gravity, describes a parabolic curve till its period of impact, either against some object at which it is directed, or the earth's surface. If the force of gravity were suspended, the ball would move in a straight line till the resistance of the air or some intervening obstacle brought it to rest, provided, of course, that no currents existed of sufficient power to deflect it from its course.

The elements of the curve depending upon the three forces above specified, of course any change in either of the forces will affect the curve, and it follows that the projectile may within certain limits be made to strike the surface of the earth at any angle, and at any required distance from the point of discharge, by varying the elevation of the gun and the amount of powder which generates the projectile force.

Secondly, a body moving through a fluid medium of the same specific gravity as the body itself is not acted upon by gravity, or rather gravity acts upon it and all parts of the fluid medium in such a way that it does not tend to change the position of the body relatively to the parts of the medium. In other words the body floats in the medium, and, if projected by any force through the medium, would describe a straight line instead of a parabola as would be the case if the projectile were the heavier.

It follows from these considerations that if a projectile so constructed that its specific gravity is the same as that of water, it may be made to penetrate the surface at such an angle that the straight line it will pursue after penetrating the surface, shall bring it into contact with the submerged part of the hull of any vessel towards which it may be directed, which of course would be fatal to any of the breastwork iron-clad vessels, the armor of which does not inclose the submerged portion of their hulls.

The projectiles are designed to be of the nature of torpedoes—to explode upon striking. Capt. Ericsson offers to meet any first-class, swift, iron-clad ship with a swift screw vessel constructed to carry two smooth-bore 15-inch guns, and provided with the necessary apparatus for submarine attack, the whole provided at his own expense and risk, and to attempt to sink the iron-clad, which he is confident he will be able to do in spite of her armament and armor, and in spite of any and all evolutions she may make; it being understood that no attack shall be made at a less distance than five hundred feet.

NEW YORK LYCEUM OF NATURAL HISTORY.

AMMONIUM AMALGAM.

At the meeting of the Chemical Section of the Lyceum of Natural History, on Monday, May 9, Professor Charles A. Seely read an interesting paper "On the Constitution of Ammonium Amalgam." He began by referring to its original discovery in 1808 by Berzelius and three other chemists almost simultaneously. Davy's reduction of potash and soda preceded the discovery of the amalgam, and led the way for other researches in this direction. The ammonium radical theory, as now generally accepted, was founded by Berzelius. Professor Seely differed in his opinion as to the constitution of the amalgam; he thought that the gases ammonia and hydrogen were only intimately and mechanically mixed with the mercury, and the peculiar spongy appearance of the so-called amalgam was due to the expansion produced by the escaping gases. If this theory be correct the uncombined gases ought to obey Mariotte's law of condensation, and Professor Seely proceeded to illustrate his idea by an experiment. Preparing a quantity of the ammonium amalgam in a tube closed at one end he submitted it to pressure by means of a piston accurately fitting the tube. The contraction and expansion of the amalgam were clearly seen and were evidently proportional to the pressure. On increasing the pressure to six or eight atmospheres the amalgam becomes liquid, resembling mercury, and on removing the pressure it resumes its original bulky condition. The liquid produced by great pressure he considered to be merely a compressed froth of mercury.

Professor Barker, of Yale College, being called upon to offer some remarks, said that he thought Professor Seely's experiment exceedingly interesting and a valuable contribution to our knowledge of ammonium amalgam, but he could not entirely agree in the explanation of its action. In what condition is the gaseous hydrogen and ammonia while under the greatest pressure. There was no visible escaping gas during the compression, and the fact that on removing the pressure the amalgam resumed its original bulk, appeared to him to be opposed to Professor Seely's physical theory.

Mr. O. Loew, of the College of New York, thought it possible to calculate the amount of hydrogen developed by a known quantity of sodium. If a portion of the hydrogen was combined with the mercury it could be determined by measuring the free hydrogen evolved. He was of the opinion that Professor Seely's experiment was additional proof of the chemical combination theory.

Dr. Isidor Waly remarked that if we adopt the physical theory we must agree that a decomposition and a recombination takes place each time that the pressure is applied and removed.

The discussion occupied nearly the whole evening, and was participated in by the leading chemists of the Society. The recent investigations of Graham and Loew into the properties of metallic hydrogen have called the attention of chemists everywhere to this subject, and hence the importance now attached to any new researches and experiments that may tend to throw light upon the questions at issue.

MANUFACTURE OF GRAPE SUGAR.

Large factories for the production of grape sugar from corn and other starch grains have been established within a short time in New Orleans, Buffalo, and Brooklyn. The first part of the process is analogous to that pursued in the manufacture of starch; and it is from the starch that the grape sugar is actually made.

The grain employed in this country is usually corn. The corn is steeped in very weak soda lye, for the purpose of softening the husk and gluten, and is then ground wet and run through revolving sieves to separate impurities; afterwards it is made to flow through ways or troughs, in which the starch gradually settles as a white powder. The wash water is run into a large cistern, and allowed to ferment and produce a weak vinegar. The starch from the troughs is put wet into the mash tub, and treated with water containing one per cent of sulphuric acid, for three to eight hours. The time of this treatment depends upon whether it is designed to convert the whole of the starch into sugar, or to make a sirup. The acid is neutralized with chalk or carbonate of lime, and the liquid evaporated to get rid of the gypsum, and afterwards further evaporated in vacuum pans, and run into barrels ready for crystallization.

Where it is only desired to make sirup, a certain percentage of dextrine is left in the solution, which keeps it liquid, and in this latter case the precaution must be observed to remove all traces of sulphuric acid. The concentrated sugar liquor is sometimes cast into blocks six inches square, and dried on plaster plates, as heat would discolor it.

A large amount of acetic acid is now made from grape sugar, as, according to a recent decision, this manufacture is not liable to the Government tax levied upon distilled spirits, and the process is cheaper than from alcohol. Brewers find it very advantageous to use sometimes as much as one half grape sugar in the mash, as there is a large saving of malt.

Grape sugar also finds a ready sale to manufacturers of wines; also as a substitute for liquid honey, for candies, and for the adulteration of cane sugar. It is a remarkable scientific fact that, while chemists can easily convert cane sugar into grape by the addition of the elements of water, the reverse operation of subtracting these elements is impossible and we cannot at present make cane sugar out of grape. The discovery of a process to effect this would be a fortune to any one, and would confer a great favor upon society, as it would then be possible to make crystallizable sugar out of a large class of refuse material. Although it is possible to make grape sugar out of linen rags, paper, shavings, sawdust, and any kind of cellulose, the operation does not pay, and a cheap starch material like corn is preferred.

The properties of grape sugar, and other facts with reference to it have been given in former numbers of this journal and need not be repeated here.

A NEW PROCESS FOR FIXING IMAGES BY EXPOSURE TO HEAT.

1st. Prepare a mixture of 60 centil. (¾ pint) of a solution saturated with bichromate of potassium, 6½ grammes (4⅙ dwt.) of gum-arabic, and 6 grammes (3⅞ dwt.) of grape sugar, dissolved together in 150 centil. (a little more than 2½ pints) of water, and 6 centil. (one gill) thick glycerin. After the mixture has been thoroughly stirred up, filtered, and left to settle, a part of it is poured out on a glass plate, laid in a flat-bottomed, wrought-iron vessel, under which a spirit-lamp is placed in order to heat the temperature until the liquid mixture in evaporating has deposited a yellow sediment, or a coating of a uniform thickness.

2d. The engraving to be reproduced on enamel (whether

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it be on stone, copper, wood, etc.) is immersed in a solution of equal parts of balsam of Canada and spirit of turpentine till it has acquired complete transparency, and the shades have taken the appearance of a wash on a glass. After this operation it is hung up to dry, and when diaphanous it is used instead of a glass positive. The image side must be placed in contact with the impressible coating, and on the whole unground plate glass must be laid, in order to obtain a complete adherence of the image to the gum coating.

3d. The whole is then brought out to daylight to render insoluble the parts exposed to its action, whilst those protected by the lineaments of the drawing preserve their mucilaginous properties, so that a viscous image is obtained on a dry ground.

4th. The image is then developed by means of a vitrifiable color of impalpable consistence laid down on the whole surface; if there is an excess of color it must be removed with a soft brush as soon as the image presents a sufficient degree of intensity. If it be dim it may be highly improved by heating and gently brushing it over.

5th. Subsequently crude collodion of good quality mixed with a few drops of refined castor-oil is poured on the entire surface, as practiced in the preparation of negative glasses. This application must not be allowed to over-dry, and it is taken off by keeping the plate in a forward and backward motion under a moderate but constant jet of water until the salt of chromium contained in the coating is almost washed off. Finally the proof is deposited in a capsule filled with acidulated water, an operation which will dissolve the last remnants of chromate, and afterwards wiped off with a piece of fine linen or calico. From that moment the work being fit for the furnace is left to dry. It is next deposited in a muffle, which is gradually brought to a red heat. The collodion burns away and the design is easily imprinted on the glass. If the image is to be fixed on other bodies than plate glass, it is advisable to wash it previously in a bath composed of one part of sulphuric acid and fifty of water, which will enable it to be easily transferred to and fixed on any other body. This operation being over the plate must undergo another minute washing in order to remove entirely the sulphuric acid, which would destroy the brilliancy of the image; but in this case it will be found expedient to add a solution of gum or of sugar in order to procure a perfect adherence of the image.

SCIENTIFIC INTELLIGENCE.

REGENERATION OF THE LAMING MASS.

It is now conceded that the best material for the purification of illuminating gas is the sesquioxide of iron, known as the Laming mass. This mass is placed in purifiers, the same as formerly, and after it has done its work it has a bad odor and must be regenerated for future use. To avoid disseminating a bad smell near the gas house, illuminating gas is forced backward through the mass for 1½ to 2 hours, which sufficiently disinfects it so that it is safe to remove the covers. One twenty-fourth as much as was originally purified is sufficient for this purpose, and this is not lost, as it can be returned through the purifiers and forced into the gasometer. With the Laming mass and the above precaution there need no longer be any gas nuisance.

NORMAL UNIT OF MEASUREMENT.

It is difficult to make a standard measure, and many devices have been suggested for the purpose. According to Fizeau the beryl expands by heat in a direction perpendicular to the principal axis and contracts on the direct line of the axis—there must be a point between the two where the contraction and expansion would be equal to zero. Soleil recommends the cutting of large beryl crystals in such a way as to afford a measure that would remain constant at all temperatures, and hopes to obtain in this manner a unit of measurement suited to the most accurate work.

RUSSIAN MINERALS.

The Russian Government has recently presented to the cabinet of the School of Mines, of Columbia College, a very choice collection of minerals. Conspicuous among them are nuggets of native gold, native platinum, iridosmine, large emeralds from the Urals, single and in clusters in the gangue; topaz, chrome garnet, malachites, etc., in all 456 rare specimens.

ADULTERATION OF ANILINE DYES.

Mr. S. Dana Hayes writes to the editor of the *American Supplement to Chemical News*, that he has recently found a curious adulteration in aniline dyes:

"It consists of fine granulated sugar, and each particle, or crystal, is so well covered with a thin film of the true aniline dye, as to produce a very good imitation, in color and form.

"The first instance was a case of sixty pounds of Hofmann's Violet, which was sold for about six dollars per pound, without discovery. It contained more than half its weight of this colored sugar, the remainder being ordinary crystals of aniline violet.

"These dyes have not been heretofore so extensively adulterated, and although this fraud may be easily detected, still it is a dangerous one, and one against which dyers and colorers should be cautioned."

A CLEVER HOAX---WHO IS DR. IVAN SLAVONSKI?

The following from Table Talk in *Appletons' Journal*, of May 28th, is a very bungling rehash of an article which appeared in the *World*, of May 1st, purporting to be a theory found in the posthumous papers of one Dr. Ivan Slavonski, an erudite Russian mathematician, in which it was attempted to prove mathematically man's immortality.

It the editor of *Appletons' Journal*, who seems to have swallowed this joke as a serious discussion, will call on the managing editor of the *World*, we have no doubt he will be favored with an introduction to the learned doctor himself, in the person of our old friend Mr. James Davis, in whose merry eye and fine metaphysical mind he will find evidence of talent, both for the perpetration of a good joke, and the elaboration of the fine-drawn theory to which the following epitome does feeble justice, besides misquoting and misrepresenting the author in various ways. He might also, perchance, be enlightened upon the subject of Dr. Meissner's "Theory of Life" and "The Hydropollusis," which we have no doubt are referable to the posthumous papers of Dr. Ivan Slavonski.

We shall not attempt to correct the errors in the following extract, as they do not spoil the joke. We confess to some surprise that the learned *savans* known to be connected with the journal referred to should have been so badly taken in.

"The immortality of the soul is so conclusively established in the teachings of Christianity, that an attempt to prove it on grounds apart from revelation must naturally seem to most minds a mere labor of supererogation—even if it be not one of irreverence; but, as evidence of the curious themes the human mind can invent, we would call the attention of our readers to a most remarkable theory propounded by the late Dr. Ivan Slavonski, a very distinguished Russian mathematician, in which he attempts to give 'Mathematical and Physical Proof of the Immortality of Man.' But it is not immortality, as we ordinarily understand it, that the learned mathematician believed himself to have established, for his 'mathematical and physical' proof consigns us for vast and indefinite periods of years to utter oblivion, but recalls us upon the stage of life at regular recurring eras, to re-enact our little drama of existence—to be born again, to enjoy, to suffer, to die, exactly as we are now born, and as we now enjoy, suffer, and die.

"We will endeavor to make Slavonski's extraordinary theory clear to the reader in as few words as possible. Dr. Slavonski asserts the atomic theory of the universe. The world is composed of a limited and definite number of indivisible atoms. Atoms are defined as the smallest existing portion of matter. The infinite divisibility of matter has been asserted by some philosophers, but Dr. Slavonski asks pertinently whether or not there is the smallest existent portion of matter. To say there is *not*, is to say there is a portion of matter smaller than itself, which is an evident absurdity. The universe being composed of a definite number of atoms, these are ceaselessly undergoing change of place, constantly combining in new forms, and with variable results. But the question arises, Into how many possible forms may these atoms be arranged, and, when every variation of form is expressed, must not former combinations recur? The letters *a* and *b*, for instance, can only be formed into *ab* and *ba*; the letters, *a*, *b*, *c*, give six variations, or permutations, which are *abc acb, bac, bca, cab, cba*. Two things may be arranged by pairs in four ways, as *a* and *b* can be placed *aa, ab, ba,* and *bb*. These letters may be varied by pairs nine ways, and, as evidence 'of the number of combinations of a few things taken by twos, by threes, by fours, and so on, it is only necessary to state that in this way the letters of the alphabet would give 1,391,724,288.887,252,999,425,128,493,402,200 changes, and not one more. This result is definitely fixed by the law of their arrangement.' And, just as there is a law of limitation in the combination of three, six, or twenty-six letters, so there must also be a law of limitation in the combination of any number of items or atoms.

"There must come a time, then, according to this rule, when all possible place-changes of the atoms composing the universe will have been exhausted, and Nature must return to forms or combinations that have previously existed. This theory, the reader will understand, asserts that the time *must* come 'when the earth will be in the same condition it is at this moment, and that it has already been a vast number of times. The geological eras which have made it what it is will again work out their necessary results, and man will appear again, each individual being precisely the same individual he is now, born of the same parents, be reared under the same circumstances, and live the same life.' This surprising theory assumes, it will be noted, that each person is no more than a 'fortuitous congregation of atoms,' and entirely eliminates all conception of soul or spirit. The vast interregnum between each of our eras of existence is described as in no way affecting us, because we should be unconscious of the duration of time. Of what that duration may be, we can form some sort of breathless guess when we recall what we have already told of the number of combinations the English alphabet is capable of.

"If any one would like to estimate how many years must elapse before the world returns to its old courses, and things that have been shall once more be, let him assume the largest possible number his imagination can grasp as a possible enumeration of the number of atoms in the universe, and then let him apply the rule of permutations, which is as follows: To find, say, the permutations of two letters, multiply one by two; of three letters, multiply one by two, and the result by three; of four letters, multiply one by two, the result by three, and the last result by four. Seven letters will give five thousand and forty possible changes—and with this start we hope some of our industrious readers will ascertain the time when our earthly turn ought to come round again. But how strange and startling is this proposition! If it assumes that, at each recurring era, we should be unconscious of preceding ones, then this sort of immortality is nothing to us; immortality, if it concerns us at all, must mean the perpetuation of our individuality—and if it does meant this, then Dr. Slavonski's theory is worse than any purgatory ever dreamed of. Think of men and women being compelled in ever-recurring eras to endure over and over again all their trials, struggles, disappointments, and sorrows, all their pains and ills, all their delusions and sharp disciplines. Think of calamity, and war, and famine, of crime and disease, of persecutions and cruelties, of sloth and debauchery, of oppression and wrong, being also immortal, forever and forever returning to renew their terrible history! Why, this conception of immortality renders life absolutely appalling, and may well make us hope that Dr. Slavonski's 'Mathematical Proof,' will be found to have omitted some important factor, by which the dire result predicted may never come about."

Accident on the West Side Elevated Railway.

An accident occurred on the 16th inst., on the West Side Elevated Railway. It seems that the directors of this novel scheme were desirous of testing the speed and strength of the road, and for this purpose had loaded a freight car with ten tuns of pig iron, and proceeding up town at a good rate of speed came to Houston street, where the propelling rope for the lower section south of that street terminates. The propulsive power is then taken up again by another "endless" rope, and by the impetus given just up to the street the cars generally cross the span without fresh power A sharp curve occurs on the southeast corner, and the passenger car, containing about fifteen people, passed over safely enough; but the freight car, with its heavy load of iron, was too much strain on the span of about eighty feet, and it was precipitated on the street, dragging with it the passenger car. This luckily alighted "plumb" on its wheels, only two of the occupants sustaining injuries, and those of a slight nature.

Editorial Summary.

LOUD'S PROPELLER—In answer to numerous inquiries, we have to say that the "Loud propelling wheel" consists of two disks or annular rims, secured upon a shaft at an angle varying from a right angle about fifteen degrees, so that the two disks intersect each other along a right line passing transversely through the shaft. The inventor's idea is that the wheel acts upon the water like an oar in sculling a boat. Mr. Loud's right to the patent was strongly contested by Senator Cole, but the matter was finally decided in his favor by the Supreme Court of the District of Columbia, and a patent was issued to him May 3, 1870. We expect shortly to publish an engraving and description of the wheel in this paper.

THE Commissioner of Mining, Mr. Raymond, in his report to Congress, estimates the bullion product of 1869 as follows:

California	$20,000,000
Nevada	14,000,000
Oregon and Washington	4,000,000
Idaho	7,000,000
Montana	12,000.000
Colorado and Wyoming	4,000,000
New Mexico	500,000
Arizona	1,000,000
All other sources	1,000,000
Total	$63,500,000

PREPARATION OF HYDROGEN ON A LARGE SCALE.—This new process consists in bringing to red heat a mixture of wetted coals and of alkaline hydrates, producing a compound of hydrogen and carbonic acid. This compound is sent through carbonates which, withholding the carbonic acid, become bicarbonates. The pure hydrogen is gathered in gasometers to supply light or heat. The bicarbonates are employed as they are, or as carbonic acid reservoirs. As for the oxides produced by the carbonization of the alkaline coals, they can be made use of in general agriculture, or other industries, or serve to form hydrates for new operations.

SPECIMENS of a new silver coinage have just been struck at the United States mint in Philadelphia of the denominations of ten, twenty-five, and fifty cents. Three different specimens of each of these denominations have been submitted to the Treasury Department for approval. The standard value of the new coins is reduced to correspond in actual value with our present "currency," with a view to its immediate use instead of the ten, twenty-five, and fifty-cent notes.

ARRANGEMENTS are being made to carry sea-water into London, so that sea baths may be enjoyed at all times of the year, without enduring the inconveniences of a journey from home. The water will be carried up in tanks on the railways at rates so moderate that the hitherto expensive luxury may be enjoyed by nearly all. The same thing ought to be done in New York. Uncleanness in body and corruption of morals always go together.

THE British Museum has cost the Government nearly $20,000,000, and it now costs nearly $600,000 a year to maintain it, or more than a dollar for every person who visits it. But the North Kensington Museum, which cost much less, is visited by three times as many people. The difference is said to be in the management rather than in the attractiveness of the collections.

AT a recent meeting of the American Geographical and Statistical Society, in New York, Paul B. Du Chaillu, the eminent African explorer, was presented, through President Daly, with a silver medal, awarded by the Imperial Geographical Society of Paris.

SOMEBODY says our Government ought to send a commission of scientific gentlemen to ascertain in what manner railroads are built and conducted in Russia. It is said that but five lives were lost on all the railroads of that empire last year.

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MODE OF NOURISHING THE SHADE TREES IN PARIS.—All the boulevards in Paris are planted with trees, many of which were, however, destroyed during the revolution of 1848. New trees were therefore planted, and their growth fostered with an amount of skillful attention that has produced astonishing results when the natural disadvantages are taken into consideration. The trees are planted in loam that has been previously mixed with sand and transported to the city. This is contained in large receptacles, lined with brick, sunk below the surface of the footway and coated over with cement, so as to render them impervious. They form, in fact, gigantic flower-pots, and into them are conducted the roof-drains of each house block, from which the earth receives its water supply. These vessels or flower-pots are built of a capacity sufficient to admit of considerable expansion of the roots of the trees. An ornamental circular grating, set flush with the footway, is placed over these basins, and around the trunks of the trees. This admits of air for the proper support of the roots.

THE "COSTON TELEGRAPHIC NIGHT SIGNALS" have lately been adopted by purchase of the patent, in the Italian Navy—they having been adopted in the Navy of France three years since, and by the U. S. Government at the commencement of the late rebellion; and, to use the words of Secretary Welles, "were of incalulable value throughout the war." These signals are the more highly appreciated by the Italians for the fact of the application and combination of the Italian national colors, viz.: red, white, and green. They are in process of adoption by several others of the great maritime powers, and are also applicable for army purposes.

HARD AND COLD WATER.—Dr. Letheby considers moderately hard water better suited for drinking than that which is very soft—an opinion which is confirmed by that of the French authorities, who took the Paris water from chalk districts instead of from sandy strata. He also stated that a larger percentage of French conscripts are rejected from soft water districts than from neighborhoods supplied with hard water, and that English towns supplied with water of more than ten degrees of hardness have a mortality of four per one thousand less than those whose inhabitants use soft water.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address correspondents by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at $1·00 a line, under the head of "Business and Personal."

All reference to back numbers should be by volume and page.

R. O., of Ind.—Printing in colors is done by using different sets of types for each color, care being taken that the sheets be laid always in the same position, for each successive impression. Shades and blended tints are not obtainable with types. Such printing is done on stone and is called lithography. Bronzed letters in imitation of gold, silver, etc., are produced by printing the letters first with a size, and afterwards rubbing them over with a soft leather pad, dipped in bronze powders. White letters are produced by plates or types on which the letters are sunk, instead of being raised, as in ordinary types.

G. E. K., of N. Y.—We believe the genuine asphalt, now so largely used in Europe, is the best material for concrete walks. See an article on the subject in another column. It is, however, probably not attainable by you. You can make a good walk of a concrete of coal-tar and gravel. Dig down four or five inches, and ram down a layer of pebbles; cover these with a layer of gravel dipped in hot coal-tar, adding coal ashes to absorb the surplus tar after the gravel has drained. Roll or ram very hard, and put on a third coat of very fine gravel in the same manner.

J. G. M., of Texas.—Metallic pens sold as steel are not all made of steel. Iron and various alloys are used. The best quality of pens are, however, steel.

J. H. W., of Cal.—You will find full instructions for softening hard water on page 217, Vol. XXI., of the SCIENTIFIC AMERICAN.

L. R. B., of Pa.—Paper hat bodies are by no means a new thing. Your method of making them may, however, be new.

D. P. D., of La.—The heads on pins are formed by dies on the blanks after they are cut from the coil of wire by the machines.

G. S., of Ohio.—You can clean rubber erasers by washing them with soap and water.

F. G. M., of N. C.—What is called British gum is identical with gum dextrine.

G. B. P., of Mass.—The commercial potash varies so much in its saponifying power that no definite rule for its weight in proportion to the amount of grease used in making soap can be given. The best way for you is to make a strong lye—sufficiently so to float a hen's egg—(the old rule for lye made from wood ashes), and then proceed exactly as in making soap from wood ashes. This correspondent has tried filling iron water tanks with pure soft water to prevent rusting, when they are not to be used, and says he finds it a thorough protection.

J. B., of N. Y.—Galvanized iron pipes are liable to attack from water containing free ammonia, or any other solvent of zinc oxide. They are therefore only proper to be used when analysis shows the water to be free from any solvent of the oxide of zinc. We believe block-tin lined lead pipe, if properly made and connected, are the best pipes yet devised to convey water for domestic use.

C. D. M., of N. Y.—The reason for using dilute acid when it is intended to scale, or brighten iron surfaces, is that the active agent in attacking the iron is the oxygen of the water used to dilute the acid The acid itself acts to combine with the oxide as fast as found, producing sulphate of iron, which, being soluble in water, is thus removed at once from the surface of the iron.

L. M., of Vt.—Few articles in market are more commonly adulterated than beeswax. The most common adulterations are Venice turpentine, fatty matters of various kinds, stearine, flour, starch, white lead, salts of soda, baryta, and various earthy matters.

J. T. C., of Ill.—The black shining mineral you send appears to be a lead ore, and may be of value. The other mineral, showing grains of golden color, appears to consist of iron pyrites, of no value.

C. W. C., of Cal.—The diamond parlor matches contain no sulphur. The splints are dipped in paraffine, which answers the same purpose as the sulphur, but has not the bad smell of the latter.

D. V., of N. Y.—Shaddocks are supposed by many to possess a peculiar tonic medicinal virtue, and are often used to make bitters, by slicing them up in alcoholic liquors of various kinds.

E. J. G.—You cannot by any process that we know of soften or restore rubber belting that has become hard. If properly vulcanized it will not harden. Such belting is worthless.

Business and Personal.

The Charge for Insertion under this head is One Dollar a Line. If the Notices exceed Four Lines, One Dollar and a Half per line will be charged.

The paper that meets the eye of manufacturers throughout the United States—Boston Bulletin, $4·00 a year. Advertisements 17c. a line.

An established house, with extended custom among western manufacturers, desires Western Agency for some valuable invention. Irrefutable credentials furnished as to ability and integrity. Address Lock Box 304, Pittsburgh, Pa.

Dickinson's Patent Shaped Carbon Points and adjustable holder for dressing emery wheels, grindstones, etc. See Scientific American, July 24th, and Nov. 20, 1869. 64 Nassau st., New York.

Peck's patent drop press. Milo Peck & Co., New Haven, Ct.

One 60-Horse Locomotive Boiler, used 5 mos., $1,200. Machinery from two 500-tun propellers, and two Martin boilers, very low. Wm. D. Andrews & Bro., 414 Water st., New York.

Kidder's Pastilles.—A sure relief for Asthma. Price 40 cents by mail. Stowell & Co., Charlestown, Mass.

Pat. paper for buildings, inside & out, C. J. Fay, Camden, N. J.

Stiff, heavy, powerful lathes, planers, shapers, slotters, and radial drills, in stock. E. & A. Betts, Wilmington, Del.

Wanted—The address of parties making belt hooks, for use with the patent round belting. Darrow Man'f'g Co., Bristol, Conn.

The New York and Eastern readers of the Scientific American will do well to remember that all of H. C. Baird's Books are for sale by S. R. Wells, 389 Broadway, New York. Send to him for catalogues.

Second-hand donkey pumps, 12, 25, and 35-H. engines, leather hose, old style blowers, cocks, valves, etc., etc. Wm. D. Andrews & Bro., 414 Water st., New York.

To Manufacturers—A mowing and reaping Machine, with front and rear cut, gearing only one wheel meshing into a spiral screw, a third less draft than any other machine. Also, a new Rake and Reel. Shop rights or States for sale. Address N. A. Wood, New York.

A Molder Wanted, with a small capital, 42 miles from any foundery. The advertising party has first-class machine tools. For particulars address Robert M. Weir, Montana, Boone Co., Iowa.

Wanted—A good second-hand milling machine. Index Miller preferred. Address P. & F. Corbin, New Britain, Conn.

Steel Makers' Materials—Wolfram ore, oxide manganese, Speigel iron, borax, titanium, chrome, lubricating black lead, for sale by L. & J. W. Feuchtwanger, 55 Cedar st., New York.

Revolving Head-screw Machines, Gang Drills, Lathes, Tapping, milling, profiling, and other machines for sewing machine works, with latest improvements and excellent workmanship, constantly on hand or finishing, by the Pratt & Whitney Co., Hartford, Conn.

Pictures for the Household—Prang's "Four Seasons," after Jas. M. Hart. Sold in all Art Stores throughout the world.

For Sale by State or County—the improvement in Buckets, etc. as described in this paper of Sept. 11, 1869. Address John H. Tomlinson, 150 Madison st., Chicago, Ill.

L. L. Smith, 6 Howard st., N. Y., Nickel Plater. First Premium awarded at the late Fair of the American Institute. Licenses granted by the U. N. Co., 17 Warren st., New York.

Of Washing Machines, there is nothing to be compared with Doty's.—Weekly Tribune, Dec. 15, 1869.

An experienced mechanical and railway engineer wishes a position as Master of Machinery, or Manager. Address "Engineer," Station "G," Philadelphia, Pa., Postoffice.

For solid wrought-iron beams, etc., see advertisement. Address Union Iron Mills, Pittsburgh, Pa., for lithograph, etc.

Keuffel & Esser, 71 Nassau st., N.Y., the best place to get 1st-class Drawing Materials, Swiss Instruments, and Rubber Triangles and Curves.

For tinmans' tools, presses, etc., apply to Mays & Bliss, Brooklyn, N. Y

Glynn's Anti-Incrustator for Steam Boiler—The only reliable preventative. No foaming, and does not attack metals of boiler. Liberal terms to Agents. C. D. Fredricks, 587 Broadway, New York.

To ascertain where there will be a demand for new machinery or manufacturers' supplies read Boston Commercial Bulletin's manufacturing news of the United States. Terms $4·00 a year.

Cold Rolled—Shafting, piston rods, pump rods, Collins pat. double compression couplings, manufactured by Jones & Laughlins, Pittsburgh, Pa

For mining, wrecking, pumping, drainage, and irrigating machinery, see advertisement of Andrews' Patents in another column.

BOSTON, May 18, 1870.

MESSRS. EDITORS:—As your readers and correspondents have been much interested to know the results of the Water-wheel tests, at Lowell, last summer, will you inform them that they will find a full report of the test of the Swain wheel, with descriptive diagrams and tables of the experiments (90 in number) on a 42-inch wheel, in the Journal of the Franklin Institute for March, 1870. This gives the mean result as follows: "With full gate, 81 3-10 per cent of the power of the water; with ¾ gate, 77 3-10 per cen; with ½ gate, 69 3-10 per cent of the whole power of the water." This wheel was of the ordinary finish. At a subsequent test, another of these wheels gave 83 7-10 per cent of useful effect. Further information on this subject can be had by addressing the "Swain Turbine Company, North Chelmsford, Mass.'

Yours respectfully, L. B. STONE, C.E.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

REVOLVING GRATE.—Adolph Brase and Lemuel Salladey, Sciotoville, Ohio.—This invention has for its object to furnish an improved fire-place grate, which shall be so constructed that it may be revolved, or turned into the chimney, or into the next room, and which shall have a fireboard formed upon its rear sides or end, which may be turned out, when no fire is required, without removing the grate.

COMBINED DOOR FASTENER AND KEY RING.—Bryant H. Melendy, Manchester, N. H.—This invention has for its object to furnish an improved combined door fastener and key ring, which shall be simple in construction and effective in operation in either capacity.

CRANK AND PITMAN.—Thomas Kealy, Lewisville, Texas.—This invention has for its object to furnish an improved crank and pitman for use upon mowing machines, reapers, pumps, and other places where it is necessary to change crank, or circular motion, into rectilinear motion, and which shall be so constructed as to greatly diminish the strain and wear attending such change of motion, when made in the ordinary manner.

HORSE HAY FORK.—John W. Hull, Connersville, Ind.—This invention relates to a new horse hay fork, of very simple construction. The invention combines the advantages of the ordinary pronged fork with those of the harpoon, by so constructing the projecting ears, so that they will be concealed like harpoons, when the load is to be discharged.

SAW FILING INSTRUMENT.—George E. Norris, Glen's Falls, N. Y.—This invention has for its object to furnish a simple and convenient instrument, by means of which a saw may be filed conveniently and accurately, at any desired pitch and bend, and which will insure all the teeth being filed exactly alike.

AUTOMATIC CARTRIDGE EJECTOR.—G. W. H. Calver, M.D., Burlington, N. J.—This invention has for its object to furnish an improved cartridge ejector, designed for attachment to all kinds of revolving or cylinder small arms, which shall be simple in construction, automatic in its action, and effective in its operation.

STEAM TRAPS.—Isaiah B. Coleman, Detroit, Mich.—This invention relates to improvements in steam and water traps, and consists in an arrangement of such traps for the application of disk valves.

HORSE HAY RAKE.—John S. Shrawder, Fairview Village, Pa.—This invention relates to a new mechanism for dumping and elevating horse hay-rakes, and for causing the automatic descent of the teeth after they have been dumped. The invention consists in the application of a peculiar gearing connection of the separate axles, with the dumping mechanism, the said connection being such as at all times to apply the joint force of both wheels to said mechanism.

BORING TOOL.—C. F. Whitney and R. Jones, Union Mills, Pa.—This invention relates to a new and useful improvement in a tool or bit for boring wooden pipes for pumps, or wooden tubing for conveying water, steam, or gas, or other liquid or fluid.

THOROUGH-BRACE SPRINGS.—John Goller, Los Angeles, Cal.—This invention relates to improvements in springs for thoroughbrace wagons and carriages, and consists in an improved arrangement of steel and wooden springs, for operation separately or together, according to the load suspended upon them, in a manner to provide more uniform elasticity, whether the load is heavy or light.

DOOR PROTECTOR.—Charles W. Gschwind, Port Republic, N. J.—This invention relates to a new plug or block, which shall serve to protect doors and walls from injury by the too far opening of the doors. The invention consists in securing a hollow rubber ball to the end of the plug or block, so that such ball will receive the pressure and shock of the door, and prevent injury to the same.

BOLT CUTTER.—Levy Daniels, Oak Hill, N. Y.—This invention relates to a new bolt cutter, in which the movable jaw is so hung that it can be operated with great power. The invention consists in so hanging the movable jaw in a pair of pivoted straps, and in a bracing lever, that the motion, although short, will be extremely powerful.

ONE-ARMED MAN'S ASSISTANT.—George W. Dalbey, Carrollton, Miss.—The object of this invention is to provide an implement whereby one-armed persons can be enabled to hold articles of food for cutting, or paper for writing and drawing. The invention consists chiefly in the employment of a spring bar, which can be pushed forward by means of the arm-stump or shoulder of a one-armed person, to operate a pivoted bell crank. This crank carries a fork or pressure pad, which when pressed upon a plate or table, will serve to hold down whatever may be placed under it.

POTATO PLANTER.—J. Krehbril, Clarence Center, N. Y.—This invention has for its object to furnish a simple and convenient machine, by means of which potatoes may be dropped and covered rapidly, thoroughly, and regularly, and in such a way as to mark the ground, so that the planting may be done with exactness and uniformity.

SPOKE TENONING AND HUB BORING MACHINE.—John Deming, Salem, Ohio.—This invention relates to improvements in machines for tenoning the spokes, and boring the hubs for mortising, also for boring fellies, and it consists in improved arrangements of devices for effecting the vertical adjustment of the boring tool head, and feeding apparatus for reciprocating the boring tool; also, in the holding devices for holding and centering the spoke for the reception of a hollow auger or tenoning tool; also, in an improved centering device for receiving and holding the hub while boring it, or tenoning the spokes, and for spacing the hubs for boring; also for holding the fellies for boring, and in an improved tenoning tool for tenoning the spokes.

RAILWAY STATION INDICATOR.—Julius P. Pfan, Lansingburgh, Conn.—This invention relates to improvements in railway station indicators, and it consists in the application between the rollers on which the canvas is wound, of a tension roller placed in front of the opening in the case for the observation of the names of stations, and the arrangement of the upper and lower rollers to be forced against it by springs or other yielding mechanism, whereby they will be moved by it, and the canvas stretched over the front side of the said middle roller, and in front of the opening, and maintaining it in a taught condition, whether it be wound more on one roller than the other or not. The invention also consists in a ratchet and pawl mechanism of peculiar construction applied to each end of the said middle roller, for moving it in opposite directions, as the cars are reversed at the ends of the routes, the said ratchet and pawl mechanisms being so constructed that after each movement the pawl is raised out of contact with the wheel, leaving it free to be moved backward if required.

AMERICAN CALENDAR WITH MOVABLE BLOCK AND DATE.—Vve. Adrien Maurin and Gustave Toiray, Paris, France.—This well known calendar is composed of a block or book, 365 paper leaves thick, the leaves representing every day in the year, and having each of them various useful notes printed thereon, as the date, the day, the month, the phases of the moon, ephemerids, etc. The said block, one sheet of which is to be taken off every day, is fixed permanently, either by glue or otherwise on a pasteboard or other ornamental plate or stand, bearing the number expressive of the current year, the whole being suspended or held within sight in the office, store, room, or other places, where it may be desired to place and expose it. The improvements consist: first, in making this block or book movable, so that it may at will be slided in and displaced and detached from its supporting or standing plate; second, in making said holding or standing plate, which may be of any suitable material, preferably of metal, so that it may serve indefinitely.

STEAM BOILER.—W. H. Law, Birminham, England.—This invention relates to a novel method of constructing steam boilers, whereby the steam generating surface is greatly increased, a full and free circulation of water is secured, and the strength of the boiler increased.

SADDLE STIRRUP.—J. A. Dunnagan, Mexico, Miss.—This invention relates to a new and useful improvement in stirrups for riding saddles, whereby ease, convenience, and durability, are combined, and it consists in the application of spiral springs (two or more) to the stirrup by which the foot piece or tread of the stirrup is made elastic.

AUTOCRATIC LAMP AND TAPER LIGHTING ATACHMENT.—W. H. Weeks. New York city.—This invention has for its object to furnish a simple, convenient, and effective, self-lighting attachment for lamp and taper burners, and it consists in the construction of the burner and wick.

INK ERASER.—H. T. Cushman, North Bennington, Vt.—This invention relates to compound tools for erasing ink on paper, and preparing the place of erasure to receive subsequent writing without blur and blot.

SPRING BED BOTTOM.—J. F. Duffy and W. P. Frailey, Chicago, Ill.—This invention relates to a new and useful improvement in bed bottoms, whereby they are made elastic and durable, and so that they may be readily taken apart for transportation or repairs, and it consists in the combination and arrangement of bow or elliptic steel springs with hoop iron and woden frames.

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HULLING MACHINE.—G. A. Buchholz Regent's Park, London, Eng.—This invention relates to improvements in the horizontal or longitudinal hulling machine, previously patented to the same inventor, the object being to reduce the cost of its construction, and increase its efficiency. Instead of making the outer case and the drum which it contains, conical, as heretofore, it is now made both cylindrical, and the central shaft which carries the drum and supports the case in position, is mounted so that it may receive any desired nclination towards the delivery end of the machine. The invention also consists in an application of the outer case of friction surfaces to the inner surfaces of the sections.

APPARATUS FOR STEAMING LARD AND OIL VESSELS.—C. J. Yergason, Brooklyn, N. Y.—This invention relates to improvements in apparatus for discharging steam into barrels and other vessels containing lard oil, and other like substances, through the bungs or other openings, as is required in oil refining and lard repacking establishments, in removing the lard and oil and refining it, and it consists in the application of nozzles or short discharging tubes to the screw-threaded ends of steam pipes, by means of pipe T's plugged at one end, and fitted to screw the plugs against the ends of the steam pipe, for stopping the flow of steam, and adapted for being received in the bung-holes of the barrels containing the lard to be removed, the said barrels being placed over the nozzles. The said arrangement is much less expensive than the cocks now used, and is intended as a substitute for them.

CLOCKS AND WATCHES.—William H. Horton, Jersey City, N.J.—The object of this invention is to provide means for counteracting the effects of variations in temperature on clocks and watches.

BREECH-LOADING FIRE-ARM.—Jarvis Davis, Buffalo, N. Y.—This invention relates to a new and useful improvement in breech-loading fire-arms, whereby they are made more simple and durable than they have hitherto been.

FLUTING SCISSORS.—Henry Gerecke, Carlstsdt, N. J.—This invention relates to improvements in the construction of fluting scissors, and consists in making the handles of cast metal and the fingers of wrought or rolled wire, and attaching them to the ends of the handles, below the pivot point by screwing or otherwise fastening them into holes in the ends of the handles.

BATHING APPARATUS.—Wm. Tell Street, Frankford, Pa.—This invention relates to improvements in safety bathing apparatus, and consists in the employment of a light bathing car, provided with rotating guards, floats, and wheels, and with hauling tackle, the latter connected to a windlass on shore, and a buoy, at sea, so arranged that the car can be drawn from the shore into the water and back again, without danger to the occupants who may enter before the car enters the water, and remain therein until it is drawn out again.

TOBACCO ROLLING MACHINE.—J. W. Stone, Paris, Tenn.—This invention relates to improvements in machines for rolling tobacco for forming it into plugs, and consists in a combination of feeding apparatus for the prepared fillings, and another for feeding the wrappers, with folding apparatus for folding the wrappers over the fillings, and inclosing them, previous to the condensing operation of the rollers. It also consists in an arrangement of the condensing rollers in sections, for the application of disks for dividing the spaces for making narrower plugs; and it also consists in the combination with the rotary cutter, for cutting the plugs, of a sliding bed, arranged to move with the cutters, while they are in contact with it.

ALARM TILL.—John F. Baldwin, Nashua, N. H.—This invention relates to improvements in alarm tills, and consists in mounting the locking bolts in a tilting case, with which the bell-hammer catch is combined in such a way that an effort to withdraw the till, without contracting the bolts, will cause the case to swing back against the bell-hammer catch, and trip the hammer, to allow it to sound the alarm. The invention also comprises a novel arrangement of the bolts and the dogs, by which they are operated to obstruct the opening by unauthorized persons, and to facilitate the changing of the combination; and it also comprises a novel construction of the bolt case, calculated to facilitate the changing of the bolts, and arranged, also, so as to be cheaply constructed.

TRACTION MACHINE.—S. S. Stuntz, Jamestown, N. Y.—This invention relates to improvements in traction machines for drawing plows, and for other heavy draft purposes, and consists in a car or truck, mounted on an endless traction device composed of broad bars or planks, connected to belts or chains, or hinged together, working over pulleys at each end, and carrying rollers or wheels, mounted in bearings, on the inner faces, on which rails, attached to the truck, rest and roll along, as the truck is propelled, in any way, the said wheels supporting the bars of the traction device on the upper side of the said rails when in the upper or returning position. It also consists in the application, to each end of the truck, of draft frames with guiding caster wheels so attached that the weight of one side, or a portion thereof, may be transferred from the draft device to the guiding wheels, when required to turn it either way from a straight line.

Official List of Patents.

Issued by the United States Patent Office.

FOR THE WEEK ENDING May 17, 1870.

Reported Officially for the Scientific American

SCHEDULE OF PATENT OFFICE FEES

On each caveat	$10
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In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

For copy of Claim of any Patent issued within 30 years $1
A sketch from the model or drawing, relating to such portion of a machine as the Claim covers, from $1
upward, but usually at the price above-named.
The full Specification of any patent issued since Nov. 20, 1866, at which time the Patent Office commenced printing them ..... $1·25
Official Copies of Drawings of any patent issued since 1836, we can supply at a reasonable cost, the price depending upon the amount of labor involved and the number of views.
Full information, as to price of drawings, in each case, may be had by addressing
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103,005.—PRUNING TOOL.—G. W. Anesley, Marengo township, Mich.
103,006.—FURNACE FOR ROASTING, OXIDIZING, AND CHLORIDIZING ORES.—J. P. Arey, Georgetown, Colorado Territory.
103,007.—HANDLE FOR BOAT HOOKS, ETC.—F. F. Bibber, Boston, Mass.
103,008.—REIN HOOK.—Grinfill Blake, Taunton, Mass.
103,009.—BOBBIN.—Milton Bliss, Ionia, Mich, assignor to A. M. Bliss.
103,010.—WINDOW SCREEN.—A. C. Brown, Chicago, Ill.
103,011.—LAMP.—Abner Burbank, Rochester, N. Y., assignor to himself, H. S. Joy, and G. D. Williams.
103,012.—MEDICINE CASE.—Alphonzo Button, Dunkirk, N. Y.
103,013.—REVOLVING FIRE-ARM.—G. W. H. Calver, Burlington, N.J.
103,014.—DIGGING AND TAMPING PICK.—Chas. Carroll, North Vernon, Ind.
103,015.—AUTOMATIC FRICTION DOG LATHE CHUCK.—Loring Coes, Worcester, Mass.
103,016.—STEAM TRAP.—I. B. Coleman, Detroit, Mich.
103,017.—GAS HEATER.—Joshua Cromly, Philadelphia, Pa.
103,018.—MANUFACTURE OF IMITATION HAIR CLOTH.—J. J. Comstock and Jas. Aborn, Providence, R. I.
103,019.—SUB-BASE REED ORGAN COUPLER.—Geo. Cook, New Haven, Conn.
103,020.—SHAFT TUG.—W. H. Correll, Nashville, Ohio.
103,021.—SHAPING MACHINE.—Alfred B. Couch, Worcester, Mass.
103,022.—SEEDING MACHINE.—C. H. Cowles, Nebraska City, Nebraska.
103,023.—ONE-ARMED MAN'S ASSISTANT.—G. W. Dalbey, Carrollton, Miss.
103,024.—SEAT FRAME FOR VEHICLE.—J.W. Dann, Columbus, Ohio.
103,025.—SPIKE, BOLT, AND RIVET MACHINE.—Maxime Decelle, Newburg, Ohio.
103,026.—SLEEPING COLLAR.—Levi Dederick, New York city.
103,027.—SUB CUTANEOUS EXHAUSTER.—G. Dieulafoy, Paris, France.
103,028.—CONSTRUCTION OF TUNNELS AND DAMS.—Lewis Dodge, Chicago, Ill. Antedated May 14, 1870.
103,029.—EARTH CLOSET.—J. A. Drake (assignor to W. R. C. Clark), New Orleans, La.
103,030.—SPRING BED BOTTOM.—Jas. F. Duffy and Wm. P. Frailey, Chicago, Ill., said Frailey assigns his right to said Duffy. Antedated May 7, 1870.
103,031.—SADDLE STIRRUP.—J. A. Dunnagan, Mexico, Mo.
103,032.—HEAD BLOCK FOR SAW MILLS.—Joseph Duvall and John Winterbottom, Kewaunee, Wis.
103,033.—WOOD LATHE.—L. H. Dwelley, Dorchester, Mass. Antedated May 9, 1870.
103,034.—COMPOSITION TO PREVENT THE SLIPPING OF MACHINE BELTS.—Ithamar F. Eaton, Boston, Mass.
103,035.—ELECTRO-MOTOR ESCAPEMENT.—Thomas A. Edison, New York city.
103,036.—GAS GENERATOR.—T. B. Fogarty, New York city. Antedated May 12, 1870.
103,037.—INSECT TRAP.—Peter Funk and Jo. Nicodemus Baader, Buffalo, N. Y.
103,038.—PLOW.—Horatio Gale, Albion, Mich.
103,039.—FLUTING TONGS.—Henry Gerecke (assignor to himself and Augustus Gerecke), Carlstadt, N. J.
103,040.—PROPELLING VESSELS.—Joseph Ghisi, Genoa, Italy.
103,041.—THOROUGHBRACE SPRING.—John Goller, Los Angeles, Cal.
103,042.—DOOR GUARD.—Chas. William Gschwind, Port Republic, N. J.
103,043.—PADLOCK.—E. P. Hall, Chicago, Ill.
103,044.—DOOR CHECK AND HOLDER.—S. L. Hart, Menasha, Wis.
103,045.—SAW TEETH.—Geo. L. Hiles, Chicago, Ill.
103,046.—MUSIC RACK.—J. R. Hill, Hyde Park, assignor to himself and H. E. Hill, Lowell, Mass.
103,047.—TRUSS.—Henry Howe, Council Bluffs, Iowa.
103,048.—LAMP EXTINGUISHER.—John Hughes, New Berne, N. C.
103,049.—SMUT MACHINE.—Fred Ihlenfeldt, Le Roy, Ill.
103,050.—LOOPING HOOK FOR SEWING MACHINE.—M. A. Keables, Brattleborough, Vt.
103,051.—MACHINE FOR STRETCHING SILK, ETC.—G. R. Kennedy, Worcester, Mass.
103,052.—MACHINE FOR SPINNING WOOL.—Edward Kilbourn, New Brunswick, N. J.
103,053.—REVERSIBLE LATCH.—Jacob Kinzer, Pittsburgh, Pa.
103,054.—REVERSIBLE LATCH.—Jacob Kinzer, Pittsburgh, Pa.
103,055.—SAUCEPAN HANDLE.—Jacob Kinzer, Pittsburgh, Pa.
103,056.—STAMP FOR FRUIT CANS.—Jacob Kinzer, Pittsburgh, Pa.
103,057.—VEGETABLE CUTTER.—Nicholas Kipper, Seymour, Ind.
103,058.—POTATO PLANTER.—John Krehbril, Clarence Center, N. Y.
103,059.—STEAM GENERATOR.—William Hartill Law, Birmingham, England.
103,060.—CORPSE PRESERVER.—Henry Lee, Washington, D. C.
103,061.—ELECTRIC FOOT WARMER.—Caleb V. Littlepage, Austin, Texas.
103,062.—SAFETY VALVE.—John D. Lynde, Philadelphia, Pa. Antedated May 2, 1870.
103,063.—FLUTING MACHINE.—Eli J. Manville, Waterbury, Conn.
103,064.—COLD-CAP STILL FOR THE DISTILLATION OF ALCOHOLIC AND OTHER LIQUIDS.—J. B. Mason, Chapel Hill, N. C.
103,065.—HORSE HAY RAKE.—Joseph A. McGee, Sharpsville, Ind.
103,066.—CHAIR, BEDSTEAD, AND CRIB.—Wm. McGregor, Chicago, Ill.
103,067.—COMBINED COTTON-SEED PLANTER AND FERTILIZER DISTRIBUTER.—W. M. McLendon, Greenville, Ga.
103,068.—COMBINED DOOR FASTENER AND KEY RING.—B. H. Melendy, Manchester, N. H.
103,069.—CORD-TENSION DEVICE FOR WINDOW SHADE.—C.H. Miller, Buffalo, N. Y.
103,070.—SEWING MACHINE.—Adam Moltz, New York city.
103,071.—PACKING FOR THE JOURNAL BOXES OF RAILROAD CARS.—Nathaniel Monroe (assignor to himself, W. T. Keen, and C. P. Stowe), Boston, Mass.
103,072.—CONDUCTOR FOR TELEGRAPHS.—Jas. Montgomery, New York city. Antedated April 30, 1870.
103,073.—TORCHLIGHT.—F. A. Morley, Syracuse, N. Y. Antedated May 2, 1870.
103,074.—COMPOUND FOR MANUFACTURE OF VARNISH AND PAINTS.—Joseph Naftel, Cleveland, Ohio.
103,075.—SAW-FILING INSTRUMENT.—G. E. Norris, Glen's Falls, N. Y.
103,076.—STEAM VACUUM PUMP.—J. H. Pattee and George H. Nye (assignors to themselves, H. J. Graham, and H. H. Pattee), Monmouth, Ill.
103,077.—ELECTRO-MAGNETIC MOVEMENT.—F. L. Pope, Elizabeth, N. J.
103,078.—RREECH-LOADING ORDNANCE.—A. F. Potter, San Francisco, Cal.
103,079.—CARTRIDGE CASE.—Timothy J. Powers, New York city.
103,080.—PLANING MACHINE.—John Richards, Philadelphia, Pa., assignor to J. A. Fay & Co., Cincinnati, Ohio.
103,081.—STEAM GENERATOR.—Peter Riley, Lancaster, Pa.
103,082.—TRANSPLANTING IMPLEMENT.—E. B. Roberts and Wm. Graham, Sturgis, Mich.
103,083.—COOKING STOVE.—Francis H. Root, Buffalo, N. Y. Antedated April 10, 1870.
103,084.—CURTAIN FIXTURE.—Franklin Root, Chelsea, Mass. Antedated May 9, 1870.
103,085.—COMPOSTING MANURE AND FERTILIZER.—Daniel Ruggles, Fredericksburgh, Va.
103,086.—STRAW CARRIER FOR THRASHING MACHINE.—C. Russell and W. K. Miller, Massillon, Ohio.
103,087.—STEAM GENERATOR.—G. O. Sampson, Jamestown, N. Y.
103,088.—GRUBBING IMPLEMENT.—John Sattazahn, Jr. Pine Grove Township, Pa. Antedated May 10, 1870.
103,089.—COMPOSITION METAL OR ALLOY.—Wm. Schrier, Logansport, Ind.
103,090.—MANUFACTURE OF SUGAR.—Constantin Rosswog, New York city, administrator of the estate of Sebastian Schuzenbach, deceased.
103,091.—MANUFACTURE OF EXTRACT OF HOPS.—C. A. Seely, New York city.
103,092.—HORSE HAY RAKE.—John S. Shrawder, Fairview Village, Pa.
103,093.—STUD FOR FASTENING NECKTIES TO COLLARS.—W. E. Simonds, Hartford, Conn.
103,094.—MANUFACTURE OF STEEL.—F. G. Slade, Trenton, N. J.
103,095.—CEMENT FOR PAVEMENTS, WALKS, ROOFS, ETC.—G. H. Smith, New York city. Antedated May 4, 1870.
103,096.—COLUMNAR MATTRESS.—H. E. Smith, New York city. Antedated May 3, 1870.
103,097.—SLEEPING-CAR BERTH.—W. B. Snow, Chicago, Ill.
103,098.—Suspended.
103,099.—MACHINE FOR RAKING AND COCKING HAY.—Z. C. Steele, Pana, Ill.
103,100.—MACHINE FOR RAKING AND COCKING HAY.—Scott Stewart, Lowell, Mass.
103,101.—SIDE-SADDLE TREE.—Jacob Straus, St. Louis, Mo.
103,102.—TRACTION MACHINE FOR PLOW.—S. S. Stuntz, Jamestown, N. Y.
103,103.—BRIDLE BIT.—J. A. Swan, North Anson, Me.
103,104.—MODE OF MAKING BOOTS.—Hiram Thayer, Monson, Mass.
103,105.—PAVEMENT.—Aaron Van Camp, Washington, D. C., and M. M. Hodgman, St. Louis, Mo.
103,106.—GRINDING MILL.—A. J. Vandegrift and G. W. M. Vandegrift, Cincinnati, Ohio.
103,107.—BRACKET FOR SUPPORTING STOVEPIPE SHELVES.—Horace Vansands, Middletown, Conn.
103,108.—CAR COUPLING.—Joseph Van Steenberg, Chicago Ill.
103,109.—MANUFACTURE AND PURIFYING OF IRON.—James Webster, Birmingham, Eng. Antedated May 4, 1870.
103,110.—AUTOMATIC LIGHTING WICK FOR LAMPS.—W. H. Weeks, New York city.
103,111.—BOX FOR TRANSPORTING EGGS.—George A. Wells, Oskaloosa, Iowa.
103,112.—WASHING MACHINE.—Philander Wilbor, Milan, Ohio.
103,113—KNIFE SHARPENER.—P. M. Withington, Stoughton, Mass.
103,114.—CARRIAGE WHEEL.—Mileden Wonser, Norwalk, Ohio.
103,115.—PREPARATION OF FIBROUS MATERIAL.—James Woodruff and Frederick Boyd, Quincy, Ill.
103,116.—APPARATUS FOR STEAMING LARD AND OIL CASKS.—C. J. Yergason, Brooklyn, N. Y.
103,117.—ALARM TELEGRAPH SIGNAL BOX.—Job Abbott, Canton, assignor to Automatic Fire Alarm Co., Leetona, Ohio.
103,118.—WHIFFLETREE.—J. J. Adair, Portland, Ind.
103,119.—MACHINE FOR JOINTING STAVES.—J. W. Alesworth, Santa Cruz, Cal.
103,120.—STEAM GENERATOR.—Dexter Amsdell, Hamburgh, N. Y.
103,121.—AIR-COMPRESSING APPARATUS.—B. T. Babbitt, New York city.
103,122.—INSULATOR FOR TELEGRAPHIC WIRE.—R. B. Baker, Philadelphia, Pa.
103,123.—STEAM COTTON PRESS.—Augustine Baldwin, New York city.
103,124.—ALARM TILL.—John F. Baldwin, Nashua, N. H., assignor to himself and the Miles Alarm Till Manufacturing Co., Providence, R. I.
103,125.—CAN OPENER.—Abel Barker, Wyoming, Pa.
103,126.—DOOR FOR RAILWAY BOX CARS.—Charles Barker (assignor to himself and T. C. Thomas), Knox county, Ill. Antedated May 13, 1870.
103,127.—APPARATUS FOR LIGHTING GAS BY ELECTRICITY.—W. W. Batchelder (assignor to George Viles, Boston, Mass.
103,128.—HARNESS BUCKLE.—Alma Bedford, Cold Water, Mich. Antedated May 5, 1870.
103,129.—WAGON SEAT ATTACHMENT.—Wm. Beers, Milan, Ohio.
103,130.—RAILWAY CAR COUPLING.—James Blakeney, Springfield, Ohio.
103,131.—ROLLER FOR SASH STRAP FOR CARRIAGES.—J. H. Bloodgood, Bridgeport, Conn.
103,132.—HARNESS SADDLE.—Valentin Borst, New York city.
103,133.—CLOTHES DRYER.—Harvey Bosworth, Champlain, N. Y.
103,134.—GRATE FOR FIREPLACE.—Adolph Brase and Lemuel Salladey, Sciotoville, Ohio.
103,135.—MACHINE FOR BREAKING, SCUTCHING, AND SEPARATING FIBROUS MATERIAL.—Edward Brasier, New Cross, assignor to J. E. Hodgkin, Liverpool, England.
103,136.—HARVESTER.—C. H. Charlesworth and J. H. Short, Avoca, N. Y.
103,137.—MILK CAN.—C. L. Clamp and J. H. Chappel, Brooklyn, N. Y.
103,138.—SPRING BED BOTTOM.—G. O. Capen (assignor, by mesne assignments, to S. A. Barker), Providence, R. I.
103,139.—SLIDING DOOR APPARATUS.—Jacob Capron, New York city.
103,140.—PISTON PACKING.—John Clark, Harrisburgh, Pa.
103,141.—PROCESS OF PURIFYING LINSEED OIL.—Richard T. Clarke (assignor to himself and Gabriel A. Taylor), Cincinnati Ohio.
103,142.—FLAP FASTENER FOR THE DASHER OF CARRIAGES.—R. Clingen (assignor to Thomas Goddard), Boston, Mass.
103,143.—LATCH FOR GATE.—Henry Clymo, Galena, Ill.
103,144.—TRAVELING-BAG FASTENER.—Friedrick Coeller, New Haven, Conn., assignor to Cornelius Walsh, Newark, N. J.
103,145.—FAUCET.—W. S. Cooper, Philadelphia, Pa.
103,146.—HAND-STAMP FOR CUTTING CHECKS, BONDS, ETC.—J. F. Cory and J. H. Brown, Brooklyn, E. D., N. Y.
103,147.—BEATER FOR THRASHING MACHINE.—JohnCrowley, Sparta, Wis.
103,148.—PLOW COLTER.—George Curkendall, Dixon, Ill.
103,149.—ERASER.—Henry T. Cushman, North Bennington, Vt.
103,150.—SIGNAL BOX FOR FIRE ALARM TELEGRAPH.—S. D. Cushman, New Lisbon, assignor to the Automatic Fire Alarm Company, Leetona, Ohio.
103,151.—STAVE-JOINTING MACHINE.—Amos Cutter, Boston, Mass.
103,152.—BOLT-CUTTING DEVICE.—Levi Daniels, Oak Hill, N. Y.
103,153.—HAND CORN PLANTER.—Augustus C. L. Davis, St. Louis, Mo.
103,154.—BREECH-LOADING FIRE-ARMS.—Jarvis Davis (assignor to P. Smith), Buffalo, N. Y.
103,155.—CLOTHES LINE HOLDER.—Jos. Davis, Harrisburg, Pa.
103,156.—RAILWAY CAR COUPLING.—T. J. Delany, Loudoun county, Va., assignor to himself and Clinton Lloyd, Washington, D. C.
103,157.—SPOKE-TENONING AND HUB-BORING MACHINE.—John Deming (assignor to himself and A. R. Silver), Salem, Ohio.
103,158.—MILK PAIL WITH STRAINER ATTACHED.—Loyal M. Doddridge, New Mount Pleasant, Ind.
103,159.—GUIDE FOR SEWING MACHINE.—Wm. C. Dodge, Washington, D. C.
103,160.—FORGE BONNET.—Walter Dunkerly, Woonsocket, R. I.
103,161.—AXLE BOX FOR CARRIAGES.—G. B. Durkee, Alden, N. Y.
103,162.—WATER WHEEL.—Wm. T. Duvall, Georgetown, D. C.
103,163.—FIRE KINDLING.—G. W. Eldridge, South Chatham, Mass.
103,164.—SHOE.—Thomas Richard Evans, Philadelphia, Pa.
103,165.—FURNITURE CASTER.—Frederic G. Ford, New York city.
103,166.—BEEHIVE.—Thomas A. Frakes, Middletown, Ill.
103,167.—CURTAIN FIXTURE.—G. P. Fuller, Humphrey, N. Y. Antedated May 10, 1870.
103,168.—BITUMINOUS ROCK PAVEMENT.—J. L. Fulton and Julius Brace, Covington, Ky.
103,169.—MATERIAL FOR ROOFING AND PAVING.—J. L Fulton and Julius Brace, Covington, Ky.
103,170.—LUBRICATOR.—Gregory Gerdom, Albany, N. Y.
103,171.—STUMP EXTRACTOR.—Charles Gernes and John H. Gruenhagen, Winona, Minn.
103,172.—RAILWAY CAR COUPLING.—William F. Grassler, Muncy, Pa.
103,173.—FILTER.—John M. Hackney, Danville, Ky.
103,174.—ELECTRO-MAGNETIC RAILROAD ALARM.—Thos. S Hall, Stamford, Conn.
103,175.—MECHANICAL MOVEMENT.—R. B. Hamel and J. B. Holden, Jersey City, N. J., assignors to themselves, Arthur M. Smith and Henry W. Newkirk.
103,176.—RADIATOR FOR HEATING FURNACES.—Chas. Harkinson, Philadelphia, Pa.
103,177.—Suspended.
103,178.—SPRING BALANCE STOP FOR SAFETY VALVE.—Baylies Hathaway, Elizabeth Port, N. J.
103,179.—STATION INDICATOR FOR RAILROAD CARS.—Wm. Hebdon, New York city.
103,180.—CULINARY VESSEL.—C. W. Hermance, Schuylersville, N. Y.
103,181.—STAY FOR TRUNK.—Louis Hillebrand, Philadelphia, Pa.
103,182.—ICE CREAM FREEZER.—B. H. Hilliar, New London, Conn.
103,183.—PERMUTATION LOCK.—J. C. Hintz, Jr., Cincinnati, Ohio.

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103,184.—Steam Trap.—James Wilson Hodges, Baltimore, Md.
103,185.—Combined Rake and Reel for Harvester.—Pliny F. Hodges, Moline, Ill.
103,186.—Combined Rake and Reel for Harvester.—Pliny F. Hodges, Moline, Ill.
103,187.—Swivel Plow.—Frederick Holbrook, Brattleborough Vt., and James A. Howe and Joel Nourse, Boston, assignors to Joel Nourse, Boston, Mass.
103,188.—Metal Injector.—John W. Hollingsworth, Mount Vernon, Ind.
103,189.—Artificial Teeth.—J. W. Hollingsworth, Mount Vernon, Ind.
103,190.—Compensating Regulator for Watches.—Wm. H. Horton, Jersey city, N. J.
103,191.—Sand-Papering Machine.—Philip Hufeland, New York city.
103,192.—Horse Hay Fork.—John W. Hull, Connersville, Ind.
103,193.—Jack Spool.—B. James, Worcester, Mass.
103,194.—Potato Digger.—Moses Johnson, Three Rivers, Mich.
103,195.—Combined Shirt and Collar.—James A. Jones, (assignor for one half his right, to Wm. S. Teel, Washington, D. C.
103,196.—Pitman.—Thomas Kealy, Lewisville, Texas.
103,197.—Pruning Shears.—Clement A. Kellogg, Elyria, Ohio.
103,198.—Fabric for Carpet Lining, etc.—J. L. Kendall, Foxborough, Mass., and R. H. Trested, New York city.
103,199.—Manufacture of Roofing Felt.—Samuel Kingan, New York city, administrator of the estate of James Anderson, deceased.
103,200.—Cutter Head for Planing Machines.—John Kuehnle, Cincinnati, Ohio.
103,201.—Nickel Plating.—Wm. Jacob Kuhns, Brooklyn, N. Y.
103,202.—Automatic Railway Switches.—Lewis E. Kurtz, Baltimore, Md.
103,203.—Clod Fender and Pulverizing Attachment for Shovel Plow.—Edward Lannay, Mowrytown, Ohio.
103,204.—Cooking Stove.—Silas H. La Rue, Allentown, Pa.
103,205.—Anchor.—Albert H. Law, San Francisco, Cal.
103,206.—Filter for Cistern.—Patrick Laughlin, Danville, Ky.
103,207.—Car Coupling.—N. Edward Leaman, Dayton, Ohio.
103,208.—Tank Furnace for Making Glass.—Geo. Leuffgen, Charlottenburg, near Berlin, Prussia.
103,209.—Coating Fabrics with Parkesine.—John Lewthwaite, Woburn Place, London, England. Patented in England, March 4, 1868.
103,210.—Knife Polisher.—Charles H. Lithgow, Chicago, Ill.
103,211.—Mill Spindle Driver.—J. M. Logan, Springfield, Ill.
103,212.—Steam Engine.—H. E. Long, Decatur, Ill.
103,213.—Lamp Burner.—William D. Ludlow, New York city.
103,214.—Varnish for Surfacing Railway Heads, Drawing and Spinning Frames.—Alfred Marr (assignor to himself and George W. Buckman), Lewiston, Me.
103,215.—Cutter Stock for Swivel Plows.—Elbridge G. Matthews, Oakham, Mass.
103,216.—Calendar.—Vve Adrien Maurin and Gustave Toiray, Paris, France.
103,217.—Harvester Rake.—Edwin R. McCall, Simcoe, Province of Ontario, Dominion of Canada.
103,218.—Manufacture of Illuminating Gas.—Edmund P. McCarthy, San Francisco, Cal.
103,219.—Churn Dasher.—Jacob W. McClure, Jefferson City, Mo.
103,220.—Nut Lock.—Thomas B. McConaughey and James Adams, Newark, Del.
103,221.—Counting Register.—William H. McNary, Brooklyn, N. Y.
103,222.—Gas Heater.—George F. Meiggs (assignor to himself and Retire C. Sturges), Boston, Mass.
103,223.—Sash Holder.—Nathan J. Meigs (assignor to himself and E. P. Merriman), West Haven, Conn.
103,224.—Fluting Tongs.—Sarah E. Mersereau, Binghamton, N. Y., administratrix of J. B. Mersereau, deceased.
103,225.—Sawing Machine.—P. Andrew Myers, Round Hill, Pa.
103,226.—Bed Bottom.—Joseph N. Newell, Adrian, Mich.
103,227.—Preparing Gold for Dentists' Use.—G. J. Pack, New York city.
103,228.—Electro-Magnetic Engine.—Henry M. Paine, Newark, N. J., assignor to himself and M. S. Frost, New York city.
103,229.—Magnetic Engine.—H. M. Paine, Newark, N. J., assignor to himself and M. S. Frost, New York city.
103,230.—Electro-Magnet.—H. M. Paine, Newark, N. J., assignor to himself and M. S. Frost, New York city.
103,231.—Construction of Electro-Magnet.—Henry M. Paine, Newark, N. J., assignor for one half to M. S. Frost, New York city.
103,232.—Shirt Bosom.—Moses Palmer, Jr., Boston, Mass.
103,233.—Bridge.—Charles H. Parker, Boston, Mass.
103,234.—Rendering Lard.—Jas. W. Patterson (assignor to Sarah E. Patterson, and John Ashcroft), New York city.
103,235.—Cooking Stove.—Alexander G. Patton, Troy, N. Y.
103,236.—Manufacture of Bunches for Segars.—Adolph Pearl, New York city.
103,237.—Railway Station Indicator.—Julius P. Pfau, Lansingburg, N. Y.
103,238.—Frame for Street Lamps, etc.—Jacob Radston, San Francisco, Cal.
103,239.—Sand and Air Chamber for Tubular Wells.—J. E. Robinson, Boston, Mass,
103,240.—Machine for Making Files.—Edward B. Rollins, Poland, N. Y.
103,241.—Machine for Cutting off Lead-Pencils.—Philip Schrag and Philip Hufeland, New York city.
103,242.—Tool-Grinding Attachment to Lathes.—James Shaughnessy, Cincinnati, Ohio.
103,243.—Feed-Water Heater and Filter.—D. E. Shaw, Chatsworth, Ill.
103,244.—Boot and Shoe-Sole Cutter.—E. F. Shaw, Boston, Mass.
103,245.—Head Block for Saw-Mills.—Andrew Shearon, Richmond, Ind., assignor to Abraham Gaar, J. M. Gaar, Jonas Gaar, and W. G. Scott.
103,246.—Bark Mill.—Robert H. Shultis, Ellenville, N. Y.
103,247.—Lid and Plate-Lifter and Pot Hook.—Thomas Simpson, Newark, Ohio.
103,248.—Steam Generator.—William P. Skiffington, New York city.
103,249.—Spring Bed Bottom.—Charles I. Skow, Racine, Wis.
103,250.—Sawing Machine.—O. C. Smith and T. S. Doll, Menallen, Pa.
103,251.—Time Alarm.—T. H. Smith, Urbana, Ohio.
103,252.—Pipe for Transmitting Pneumatic Currents for Motive Power.—Robert Spear, New Haven, Conn.
103,253.—Apparatus for the Production of Bromine.—Hermann Stieren, Mason, West Va., and William A. Nisbet, Natrona, Pa.
103,254.—Sewing Machine.—Levi W. Stockwell, Akron, Ohio.
103,255.—Tobacco Rolling Machine.—J. W. Stone, Paris, Tenn.
103,256.—Key-Hole Guard Lock.—H. R. Towne, Stamford, Conn.
103,257.—Clothes Dryer.—J. N. Valley, Detroit, Mich.
103,258.—Potato Digger.—Cornelius Van Derzee and Benj. Reamer, Albany, N. Y.
103,259.—Corn Planter.—W. E. Vernon, Franklin county, Mo.
103,260.—Earth Closet.—C. A. Wakefield, Pittsfield, Mass.
103,261.—Saw Mill.—Charles Warren, Center Groton, Conn.
103,262.—Cloth Press.—C. H. Weston and John Dennis, Lowell, Mass.
103,263.—Cloth Press.—C. H. Weston and John Dennis, Lowell, Mass.
103,264.—Harness.—Lewis Whitehead, Nunda, N. Y.
103,265.—Boring Tool.—E. F. Whitney and Reuben Jones, Union Mills, Pa.
103,266.—Artificial Fuel.—Charles D. Williams, St. Paul, Minn.
103,267.—Embossing Attachment for Printing Presses.—Henry Willson, Chicago, Ill.
103,268.—Wrench.—Walter F. Wolfkiel (assignor to Morris, Tasker & Co.), Philadelphia, Pa.
103,269.—Gearing for Clothes Wringers.—G. C. Wright, Leroy, Ohio.
103,270.—Fence.—W. P. Wright, Winamac, Ind.
103,271.—Apparatus for Refrigerating and Making Ice.—H. T. Yaryan, Nashville, Tenn.
103,272.—Register for Odometers, etc.—William Yorke, Portland, Me.
103,273.—Felly Plate for Carriage Wheels.—Francis B. Morse (assignor to himself and H. D. Smith & Co.), Plantsville, Conn. Antedated May 12, 1870.
103,274.—King Bolt Socket for Carriages.—F. B. Morse (assignor to himself and H. D. Smith & Co.), Plantsville, Conn. Antedated May 12, 1870.

REISSUES.

3,969.—Machine for Making Wrought Iron Nails.—Daniel Armstrong, Chicago, Ill.—Patent No. 98,008, dated December 21, 1869.
3,970.—Apple-Parer.—A. G. Batchelder, Lowell, Mass.—Patent No. 87,322, dated March 2, 1869.
3,971.—Children's Carriages.—B. P. Crandall, Wm. E. Crandall, and C. T. Crandall, New York city, assignees of B. P. Crandall.—Patent No. 98,351, dated December 28, 1869.
3,972.—Children's Carriages.—W. E. Crandall, New York city.—Patent No. 100,121, dated February 22, 1870.
3,973.—Molding Watch Cases, Lockets, and other Articles from Hard Rubber.—Halsey's Patent Box and Case Company, New York city, assignees of W. H. Halsey.—Patent No. 81,082, dated August 18,1868.
3,974.—Division No. 2.—New Articles of Manufacture from Hard Rubber.—Halsey's Patent Box and Case Company, New York city, assignees of Wm. H. Halsey.—Patent No. 81,082, dated August 18, 1868.
3,975.—Wagons.—L. M. Ham, Boston, and John H. Dodge, Chelsea, Mass.—Patent No. 39,315, dated July 28,1863.
3,976.—Grain Drills.—Joseph Ingels, Milton, Ind.—Patent No. 37,345, dated January 6, 1863.
3,977.—Harvesters.—C. H. McCormick and L. J. McCormick, Chicago, Ill., assignees of McClintock Young, Jr.—Patent No. 21,587, dated September 21, 1858; reissue No. 779, dated July 19,1859; reissue No. 866, dated December 13, 1859.
3,978.—Harvester Rakes.—C. H. McCormick and L. J. McCormick, Chicago, Ill., assignees of McClintock Young, Jr.
3,979.—Combined Rake and Reel for Harvester.—C. H. McCormick and L. J. McCormick, Chicago, Ill., assignees of McClintock Young, Jr.—Patent No. 30,103, dated September 18, 1860.
3,980.—Farm Fence.—C. W. Reeder, Chillicothe, Mo.—Patent No. 92,359.—Dated July 6, 1869.
3,981.—Reflector.—W. G. Schmidlin and J. W. Driscoll, New York city.—Patent No. 32,722, dated July 2, 1861.
3,982.—Division A.—Equilibrium Spring.—Charles Shea, Newark, N. J.—Patent No. 95,736, dated October 12, 1869.
3,983.—Division B.—Compensating Spring.—Charles Shea, Newark, N. J.—Patent No. 95,736, dated October 12, 1869.
3,984.—Division C.—Compensating or Equilibrium Springs.—Charles Shea, Newark, N. J.—Patent No. 95, 736, dated October 12, 1869.
3,985.—Machine for Making Paper Boxes.—S. B. Terry, Jr., Waterbury, Conn., and D. S. Robeson, Philadelphia, Pa., assignees, by mesne assignments, of S. B. Terry.—Patent No. 25,373, dated September 6, 1859.
3,986.—Folding Chair.—E. W. Vaill, Worcester, Mass., assignee of J. D. Merriam.—Patent No. 37,324, dated January 6, 1863.

DESIGNS.

4,023.—Clock Front.—John H. Bellamy, Charlestown, Mass.
4,024.—Steam Radiator.—Wm. Burdon, Brooklyn, N. Y.
4,025.—Trade Mark.—W. J. Clark, Providence, R. I.
4,026 and 4,027.—Carpet Patterns.—Jonathan Crabtree, (assignor to James Bromley & Brothers), Philadelphia, Pa. Two Patents.
4,028.—Carpet Pattern.—Jonathan Crabtree (assignor to Israel Foster) Philadelphia, Pa.
4,029.—Ax.—C. B. Drew, Boston, Mass., assignor to Underhill Edge-tool Company, Nashua, N. H.
4,030.—Label.—J. S. Dunham, St. Louis, Mo.
4,031.—Dovetail.—H. H. Evarts, Chicago, Ill.
4,032.—Carpet Pattern.—Israel Foster, Philadelphia, Pa.
4,033.—Grate.—J. B. Gayle, Raleigh, N. C.
4,034.—Face Plate for Locks for Sliding Doors.—Wm. Gorman (assignor to Russell & Erwin Manufacturing Company), New Britain, Conn.
4,035.—Carpet Pattern.—William Kerr (assignor to Israel Foster), Philadelphia, Pa.
4,036.—Tobacco Knife.—Jacob Kinzer, Pittsburgh, Pa.
4,037.—Hand Stamp.—Charles G. Mortimer, New York city.
4,038.—Lamp Chimney.—George W. Moyers, Gordonsville, Va.
4,039 and 4,040.—Carpet Patterns.—Elemir J. Ney, Dracut, assignor to Lowell Manufacturing Company, Lowell, Mass. Two patents.
4,041.—Wheel-holding Block for a Caster.—S. J. Parker, Williamsport, Pa.
4,042.—Package.—George Pustkuchen, New York city.
4,043 to 4,049—Stove Plates.—S. H. Ransom, Albany, N. Y. Seven patents.
4,050.—Arrow Gun.—Charles Robinson, Boston, Mass.
4,051.—Lamp Shade.—G. L. Smith and D. W. Kissam Bridgeport, Conn.
4,052.—Toy Steam Engine.—Alanson Pierson Tyler, Boston, Mass.
4,053.—Stove.—S. S. Utter, Brooklyn, N. Y.
4,054.—Stove Plate.—N. S. Vedder, Troy, and Tobias S. Heister, Lansingburg, N. Y., assignors to J. L. Mott, New York city.

EXTENSION.

Furnaces for Smelting Iron.—T. H. Powers, Milwaukee, Wis.—Letters Patent No. 14,827, dated May 5, 1856.

APPLICATIONS FOR EXTENSION OF PATENTS.

Ore Washer.—Hezekiah Bradford, Reading, Pa., has applied for an extension of the above patent. Day of hearing July 27, 1870.

Machine for Pressing Bonnets, Bonnet Frames, etc.—Mary J. Osborn, Louisville, Ky., administratrix of William Osborn, deceased, has petitioned for the extension of the above patent. Day of hearing August 3, 1870.

Lime Kilns.—Levi Averill, Elmira, N. Y., has petitioned for an extension of the above patent. Day of hearing August 3, 1870.

Hand Seed Planters.—J. Herva Jones, Rockford, Ill., has applied for an extension of the above patent. Day of hearing August 10, 1870.

Horse-powers.—Albert W. Gray, Middletown, Vt., has applied for an extension of the above patent. Day of hearing August 24, 1870.

Facts for the Ladies.

I have used a Wheeler & Wilson Sewing Machine for years, and it has never been a day out of repairs; have sewed the finest cambric and th heaviest overcoating; have used one needle over three years, and, indeed, never broke but one out of the original dozen that I got with the machine, and that was my fault. "Wheeler & Wilson" are our politics for the ladies.

Sarah E. Emswiler.

Peru, Ind.

Inventions Patented in England by Americans.

[Compiled from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

1,068.—Treatment of Metal Surfaces Coated by Electro-Deposition with Nickel.—Isaac Adams, Jr., Boston, Mass. April 12, 1870.

1,070.—Structures for the Preservation of Fruits, etc.—Nathan Hellings, Philadelphia, Pa. April 12, 1870.

1,093.—Looms for Weaving.—James Brierly, Millbury, Mass. April 14 1870.

1,185.—Studs or Buttons.—J. B. Carter, Hartsville, and W. D. Knowles New Albany, Ind. April 19, 1870.

Caveats are desirable if an inventor is not fully prepared to apply for a patent. A Caveat affords protection for one year against the issue of a patent to another for the same invention. Patent Office fee on filing a Caveat, $10. Agency charge for preparing and filing the documents from $10 to $12. Address MUNN & CO., 37 Park Row, New York.

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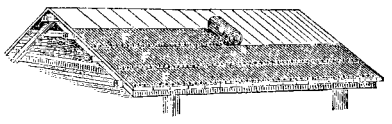

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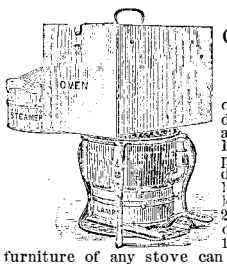

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III.—Upon a given side to draw a hexagon; to draw a heptagon; how to describe an octagon in a given square; to draw a straight line equal to any given part of a circle; to find the stretch-out of a semicircle; definition of polygon; definition of parallelogram.

IV.—To strike an ellipse or oval with the compasses, the length or major axis being given; to describe an ellipse within a given square, or when the major and minor axes are given; method of drawing an egg-shaped oval; graphic illustration of what an ellipse really is; another method of drawing an ellipse to draw a parabola; to draw an ellipse with a trammel.

V.—To strike a pattern for a round, tapering, or flue article, or a frustum of a cone; the plan of a round flue body to be cut in three pieces; two or three methods of describing ovals.

VI.—The pattern of an article where the sides are straight and the ends semicircular; the pattern of an oblong tapering pan in two parts or sections.

VII.—The pattern for a tapering oblong article in one piece, such as a flue oblong candlestick; the pattern for a tapering oval article in four pieces or sections.

VIII.—To describe a tapering oval body in one piece; a method of drawing an ellipse or oval with a string and pencil.

IX.—The pattern of an egg-shaped oval tapering body; another method of describing an oval tapering body.

X.—To describe a tapering oval body where the tapering is not equal on all sides.

XI.—The pattern for a square tapering article or pyramid; the pattern for a tapering octagon body in one piece; the pattern for a diamond-shaped tapering body, in one piece; the pattern of a square funnel where one side is straight or upright.

XII.—The pattern for a square or rectangular tapering top or tray, with sides and bottom in one piece; the pattern for a hexagon mold or tray, having the bottom and sides in one piece; the pattern of an irregular octagon pan or tray, with the sides or bottom in one piece; the pattern of an oblong pan, with round corners, but struck from different centers, and tapering more at the ends than sides.

XIII.—A pattern for a tapering top, the base being straight at the sides, and with circular ends, the hole in the top to be circular and parallel with the case (similar to a tea bottle top).

XIV.—The pattern for a tapering article, oval at the base and round at the top (such as an oval canister top, having a round hole for the neck and cover).

XV.—A pattern for the tapering sides of a tray, having various curves.

XVI.—The pattern for an oblong tapering bath.

XVII.—The pattern of an elbow at right angles, in a round pipe; a pattern of an elbow in a round pipe at any angle required (in this case an obtuse angle); the pattern of a tapering piece of pipe to join two upright cylinders to form a double elbow.

XVIII.—The pattern for a T-piece, or to join two cylinders at right angles; the pattern of two cylinders for joining at an oblique angle for slanting direction.

XIX.—The pattern for a lobster-back cowl; the pattern for a round pipe, to form a semicircle for connection to other pipes.

XX.—The pattern for a cone and cylinder to intersect or meet at right angles with their axes.

XXI.—A cylinaric section through any given angle; to draw an ogee arch; another method; to find the covering of an ogee dome, the plan of which is hexagonal.

XXII.—The pattern for a rectangular base and bottom in one piece, where the flue or curve is equal on all sides (such as may be used as a base for either an aquarium or a fern case); the pattern for an hexagon base.

XXIII.—The pattern for a vase, octagon shape.

XXIV.—The pattern for a vase having twelve sides (duodecagon).

XXV.—The pattern for a cone with an elliptic base; the pattern of an oblique cone, or the frustum of a cone cut parallel with the base.

XXVI.—The pattern for a round-end bath tapering more at the ends than at the sides.

XXVII.—The pattern for a hip bath.

XXVIII.—The pattern for a traveling sitz bath.

XXIX.—The pattern for a globe formed of twelve pieces joined together; the pattern for a triangular pedestal or pyramid, with all three sides alike (an equilateral triangle); to obtain the radius required for striking the pattern of a slightly tapering article, without the necessity of producing lines to meet.

XXX.—The patterns for the sides of an irregular octagon pan.

XXXI.—The pattern for a cover and neck of an irregular octagon article, such as a tureen.

XXXII.—The pattern for the top of a jack screen.

APPENDIX.

RULES FOR BOILER-MAKING, ETC.

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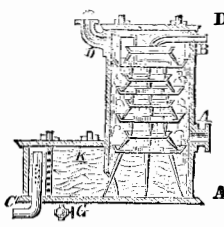

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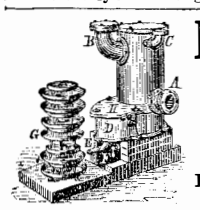

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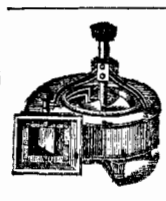

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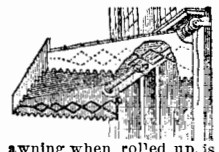

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